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THE SUBDISPENSARY SYSTEM IN UGANDA.

By W. Leslie Webb, M.R.C.S., L.R.C.P., M.B., B.S., D.P.H.

(*Director of Medical and Sanitary Services, Zanzibar; formerly Deputy Director of Medical Service, Uganda.*)

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1. *Introduction.*

In native dependencies, the funds available for medical activities are usually inadequate to establish and maintain a service of qualified medical men in sufficient numbers to serve the general native population. Usually such service can only be made available for natives in the vicinity of headquarter stations and thus the rural population, representing about 95 per cent. of the total, is excluded from its benefits. One of the principal objectives of a medical service in an African territory is to improve the hygienic standards of indigenous races, and this objective is clearly unattainable unless the organization includes adequate provision for the majority of the population, that is, the villagers. In townships, sanitary, administrative and municipal services exist, whereby the natives living therein can be forced to live up to a sanitary excellence foreign to them. In the villages there are no comparable services and it is necessary to introduce some factor here other than administrative pressure, in order that the aims of the medical department may be realized. In Uganda we have tried to secure the sympathetic co-operation of the native himself by means of the establishment of rural subdispensaries.

2. *Historical.*

A study of past Annual Reports invites the conclusion that in the period before the war the Medical Service was primarily concerned with the welfare of officials, their servants and employees, and with the rural population only when the safety of the European was threatened by the outbreak of epidemic disease. The sleeping sickness epidemic of 1901 and subsequent years directed the attention of the authorities to the necessity for closer medical control of the rural population, but little could be done owing to the inadequate numbers of European medical officers and Asiatic sub-assistant surgeons for the routine

duties required of them, and to the absence of trained African staff. In 1907, however, at the request of Sir H. Hesketh BELL, Colonel F. F. LAMBKIN, R.A.M.C., visited Uganda to report upon the prevalence of venereal disease and to suggest measures for its control. He recommended that a central venereal hospital should be established at Kampala and that treatment rooms under the charge of trained African attendants should be opened throughout the country so situated as to be within reasonable reach of all patients. This was the first proposal to train the African and to employ him in a responsible medical post. In 1908 SPARKES, TREVES and KEANE, all of the R.A.M.C., arrived to implement LAMBKIN'S recommendations when a hospital of a temporary nature was built near Kampala and two treatment rooms, the prototypes and forerunners of subdispensaries but for the treatment of venereal diseases only, were opened at Mityana in 1909 and Masaka in 1910. KEANE opened each of these centres and as he was of necessity away from them a good deal, he trained his two interpreters to give injections and undertake the routine work during his absence. These were the first natives to undertake responsible medical work.

SPARKES and TREVES went home in 1910 and KEANE remained to carry on the work. He understood that there was no possibility of his colleagues being replaced by other medical officers and he therefore sought the sanction of the authorities to undertake the training of African staff, and for the official recognition of such training. The suggestion met with considerable opposition at first, but eventually sanction was obtained and by 1914 the organized training of Africans as medical attendants was being undertaken at the venereal diseases hospital at Mulago near Kampala. Upon the outbreak of war the venereal campaign and the subdispensaries came to an end, but the natives who had been trained at Mulago were enrolled in the Uganda Medical Corps established by KEANE at the beginning of the war, and formed the nucleus of the new organization as instructors. This body eventually became the African Native Medical Corps, with a strength of 1,000 and with total enlistments of 1,650, and the organized training of Africans in medical subjects was one of its most important undertakings. After the war the country did not settle down until 1921, when Mulago was re-opened as a venereal hospital and staffed with trained ex-A.N.M.C. attendants. Training was continued and extended and by the end of the year it was possible to open and staff five subdispensaries under Mulago. In 1923 Mulago became a general hospital and the subdispensaries followed suit and emerged as the general treatment centres which they are to-day. By this time the experiences of the war had revolutionized the outlook of the authorities with regard to the employment of trained African attendants, and particularly their use in extending the benefits of western medicine to the hitherto neglected rural populations. The policy was adopted and forwarded in every way by Dr. C. A. WIGGINS, then Director of Medical and Sanitary Services for the Protectorate, and the interest of the African in the movement was raised and maintained by the indefatigable efforts of Mr. J. C. R. STURROCK, at that time Provincial Commissioner of Buganda.

Subdispensaries became so popular that natives clamoured for them in every district, and by 1932 there were about 90 all over the country dealing with over 400,000 new cases and two million attendances annually. It seems probable that public demand will not be satisfied until there is a subdispensary at the headquarters of every district

chief. The popularity of dispensaries and of European methods of treatment is so marked to-day as to be accepted as part of the mental make-up of the African, but it must be remembered that this popularity was gained by hard work and a determination to assist them and gain their confidence. Our sheet-anchor in the early days was the exhibition of really effective treatment with the highest possible result in cured cases, dramatic cures being aimed at whenever circumstances permitted.

3. *General Description and Aims of the System.*

A subdispensary is a fixed unit conveniently situated amongst a rural population, in the charge of a trained native attendant and supervised at regular intervals by a medical officer. Its primary aim is to establish itself amongst the people as a popular institution and to do so its first function must be the relief of disability. When confidence has once been gained in this way the African can readily be persuaded to submit to curative measures that he would not otherwise accept, operative interference for example, or protracted treatment of a disease such as syphilis after signs and symptoms have disappeared. Later he will submit, at his own subdispensary, to preventive measures such as vaccination or inoculation even though they impose some disability and, as far as he can see, do no conceivable good. He will report events which he has been told are of importance, such as the death of rats or the prevalence of an infectious disease. By example and persuasion he can be led to improve the hygienic standards of his dwelling and its surroundings. Maternity and child welfare work can be established with ease at a centre already popular and highly regarded on account of the obvious benefits received from it. Thus, a subdispensary which was established for the routine treatment of minor ailments can, later on, establish itself as a vital health centre amongst the population which it serves, embodying in its activities three of the main divisions of medical science, the curative, the preventive and the statistical. It would be wrong, however, to assume that the subdispensaries of Uganda are performing all these functions. None have yet reached the final stage, many have not passed the first stage of being only curative centres, but every year some take on preventive duties and a few are definitely established as rural health centres.

4. *The Financial Aspect of the System and its Relation to the Provincial Administration.*

A subdispensary undertaking should be as much an administrative as a medical scheme, and the co-operation of district officers is essential. The District Officer is the head to whom his people look for advice and direction. He, or his assistants, are continually on tour in their district and are in closest touch with popular thought. Their powers of persuasion are great, and the disposal of funds and of labour is in their hands. The District Officer should regard subdispensaries in his district as part of the machinery of successful administration. If the natives and both administrative and medical officers can be induced to want subdispensaries, it is surprising how easy it is to establish the system and at what little cost. It has been the policy of the Uganda government to throw responsibility for the cost of their erection and maintenance as far as possible upon the shoulders of the administrations concerned. Each district has at its disposal a public fund derived from a proportion of the taxes collected, known as the Native Administration Fund. This money is controlled by the local

native council, advised by the administrative officers and a yearly estimate is submitted for the approval of government of the way it is proposed to use the fund. Provision is made from these funds for the costs of erection and maintenance of subdispensaries. Naturally the wealth of districts varies and in those districts that can afford it the whole cost of erection is met from these funds, the choice of type of building being left very much to the discretion of the local authorities. Within the last few years the richest districts in the Eastern Province have built complete hospital units in permanent material at a cost of £4,500 a unit. The advantage of such large units is however not yet certain. In less rich districts, a suitable dispensary building and out-houses in permanent or semi-permanent material can be built for £300 if free labour is available, whilst in the poorest districts, where labour only can be contributed, the cost of providing cement floors, windows and doors for a building in temporary material, *i.e.*, mud and wattle walls and a thatch-roof, should usually not exceed £100. In these cases this sum must, of necessity, be provided from Protectorate funds. The cost of the initial equipment of a subdispensary varies with the type of unit and is usually shared by native administrations and government according to circumstances. The average annual cost of maintenance is about £300 to £400 under the following heads, overhead charges being excluded :—

	£		£
Personal emoluments—Native Staff ...	55	to	80
Car allowances to supervising medical officers	40	,,	60
Drugs, dressings and equipment	205	,,	260
	£300		£400

The cost of recurrent charges is borne from native administration funds in the case of districts which can afford it, and by government in districts which cannot ; in other cases a proportion of the cost may be contributed by native administrations.

5. *Buildings and their Siting.*

Subdispensary buildings vary in Uganda from a mud and wattle thatched roof two-roomed dispensary building with a cow-dung floor, to a unit in concrete blocks with corrugated iron roof and cement floor throughout comprising buildings which go to make up a complete hospital. The essentials of a subdispensary are an adequate dispensary building and quarters for staff. The nature of the building is almost of minor importance, although it is always desirable to have it in permanent material if possible, but it will be found that each district will provide what it can afford. The plot on which the subdispensary is built should be about 5 acres, because it will be found that whether in-patient accommodation is provided or not, there will always be plenty of in-patients for whom, in the absence of better accommodation, their friends will build little temporary huts in the immediate vicinity. Although they rely for their main attendances upon the surrounding population, these subdispensaries attract the sick from 20 to 30 miles away, and some accommodation must be found for these strangers.

The majority of patients, however, are drawn from an area enclosed within a radius of from 5 to 10 miles of the subdispensary, those living nearest attending the most frequently. It is usually desirable to site the unit in a country where the concentration of population does not

fall below 60 to 70 per square mile over the whole area, thus serving from 5 to 20 thousand people. If it is assumed that the concentration of population is constant at 60 per square mile over the whole area, it may be expected that the 5,000 inhabitants of the 5-mile circle will provide over half the attendances, the 15,000 living in the 5-mile belt surrounding this circle a third, the remainder being accounted for by those living further afield and travellers, but these figures vary widely according to circumstances. Nevertheless, a population of 3,000 in the immediate vicinity will often justify the erection of a subdispensary, even if the surrounding country is but sparsely inhabited. The concentration of population is usually highest at the administrative headquarters of a chief and it is always desirable to site subdispensaries there, where they form one unit with the local council house and the gaol; moreover, it is here that district officers attend regularly for routine administrative duties, and thus additional supervision is gained, and the subdispensary has little chance of being neglected. Another advantage of this siting is that the chief can give direct supervision to the subdispensary staff and he usually develops a pride in a unit which forms part of his own headquarters, and will see that it becomes in no way inferior to the subdispensaries at the headquarters of his fellow chiefs.

Accessibility too is essential, as the regular supervision by medical officers is a necessary feature of the scheme. The building should thus be sited on a motor road and should usually be not more than 50 miles from the station of the visiting medical officer.

6. *Staff.*

The native staff of a subdispensary usually consists of a charge attendant, one or more junior attendants and, when possible, an African nurse. As the subdispensary takes up its extended duties as a health centre this staff will be increased perhaps by a native midwife and attendants trained in preventive work. The charge attendant and his staff should be of the tribe of the people amongst whom they are working. This though not always possible is always desirable. The attendant must be of good character, sympathetic, intelligent, and capable of assuming reponsibility. A knowledge of English is desirable since he will be required to keep case sheets of the patients who come to him for relief. He must be capable of recognizing such diseases as yaws, syphilis, leprosy, sleeping sickness, etc., of recording what he has recognized and of treating the conditions appropriately by intravenous and intramuscular injection. He must be competent to undertake the local treatment of injuries, ulcers, abscesses and similar conditions. He should be able to treat minor ailments, such as malaria, cough, indigestion or constipation, by stock medicines, and be able to recognize by the use of pulse, temperature and general observation, a condition as being serious, and to take measures to ensure that such a case is seen soon by a doctor.

To attain such a standard a course of training of about three years is necessary, and it may be expected that only about one, or perhaps a little more, in every ten of the candidates selected and accepted for training will succeed in becoming efficient charge attendants. This type of training may be undertaken either at a central hospital or sometimes quite successfully by an enthusiastic district Medical Officer. In Uganda assistants designated Senior African Medical Assistants are being trained up to a standard rather in advance of that of the Asiatic

sub-assistant surgeon and almost comparable to that of a qualified medical man. Such assistants, who are licensed to practise under the local Medical Registration Ordinance, can, of course, only be trained in a medical school based upon a central and fully equipped training hospital.* Some of these assistants have been placed in charge of the larger subdispensaries but it is still an open question whether they will find their greatest sphere of usefulness in this capacity. Their training represents the latest advance in the progress of medical training recorded in the historical part of this paper. The subdispensary system was established long before the idea of setting up a medical school was received, and such highly trained assistants are in no way essential to the success of such a scheme, although the subdispensaries may form a useful complement to the school in affording additional training ground.

Before leaving the question of staff further reference must be made to the nurse mentioned above. The training of female attendants has been found to be unsatisfactory, partly because the women do not appear to have the same capacity for education as the men, and partly because it is at present almost impossible to attract the right type of girl for the work. Nevertheless, it is certain that in time, as in more civilized countries, the nursing of the sick in Africa must become woman's work, and so it seems desirable to continue with the effort however disappointing the results may be. Another important reason for the employment of women attendants is that the native woman, clothed or unclothed, is essentially modest and resents intimate examination or handling by the other sex to the point of refusing treatment, though she will accept such treatment from her own sex. Women are the essential people to attract to a subdispensary because through the women we get the children, and it has been considered desirable, therefore, to give the opportunity of perhaps inefficient treatment at the hands of our native nurses, rather than no treatment at all. Finally, this practice removes the male attendant from a situation fraught with temptation.

7. *Establishing and Maintaining a Subdispensary.*

The decision to erect a subdispensary in a district is usually arrived at by discussion between the District Officer, the Medical Officer and the Chiefs of the district concerned. The Medical Officer informs the head of his department of the proposal, whilst the District Officer refers the matter to his Provincial Commissioner with an estimate of the money and labour he can contribute towards the project. The proposal is sent to the headquarters' medical office, and if the approval of government is obtained, provision is made in estimates for any charges to be met from government funds. Plans are provided or approved by medical headquarters and the actual building is undertaken by the District Officer, by contract or otherwise. When the unit is built, staffed, equipped and opened it is advisable that preliminary propaganda should be undertaken at the local councils by district officers when on tour.

Patients are seen by the charge attendant. If the disability is serious, or treatment likely to be protracted, details are filled in on case cards which are retained at the dispensary to form a card index system, the patient retaining a slip with the appropriate card number only. On account of expense case cards are dispensed with for minor com-

* See this *Bulletin*, Vol. 30, pp. 659–668.

plaints and the slip retained by the patient is the only record of treatment. In all other cases there is a complete permanent record of the case which is available even if the patient transfers to another unit for subsequent treatment. Patients are encouraged to pay something for their treatment even if it is only a few cents, and money so collected is recorded on the case sheets and slips and is eventually credited to Protectorate revenue, though native administrations have repeatedly represented that such contributions would be more equitably credited to native administration funds. Although payment is encouraged treatment should never be refused on acount of inability to pay, and it is advisable to give it free in all cases of infectious disease where the disability is of as much importance to the community as to the individual, particularly in the case of women and children. The whole question of payment is a difficult one and must be governed by the circumstances of each case.

The important day at a subdispensary is that of the medical officer's visit, which should be weekly. An occasional surprise visit is desirable but otherwise the doctor's visiting day should be a regular one, known to every one concerned so that those patients wishing to do so can be certain of seeing him. He travels by car, for which he receives a mileage allowance, bringing with him the weekly supply of drugs, dressings, and any patients who have been taken to his headquarters' hospital for treatment and have now recovered. He takes back with him patients who cannot be satisfactorily treated at the subdispensary for admission to his hospital.

The Medical Officer should take the clinic himself on his visit, and should see new cases which have attended since his last visit, as well as the more serious old cases set aside for him by the charge attendant. His other duties include a scrutiny of case sheets, accountancy and receipt of payments made, and it may be desirable to restrict the administration of expensive drugs such as salvarsan to the one day of his visit. At many of the subdispensaries the attendants visit outlying parts of their districts in a preventive capacity daily, and in these cases the medical officer will receive the reports of the inspectors with regard to vaccination and inoculations performed, rat mortality, general sanitary conditions and other matters of public health interest. His duties must vary in accordance with the stage of development of the subdispensary, but through his subdispensaries a district officer can, in time, obtain a complete knowledge of the sanitary conditions of every village in his district, and of the physical condition of their inhabitants.

8. *Conclusion.*

I have touched upon the origin of the subdispensary system and tried to show how it is the instrument by means of which preventive measures can be imposed upon rural populations and how also it is the connecting link between the medical and administrative services. But it stands for more than this. Much has been said recently in favour of indirect rule in Africa, a form of government originally involved in Nigeria and Uganda. The subdispensary system is perhaps the most important practical application of this form of government in which, under the guidance of the European, the native himself applies with his own capital and labour a scheme for his own betterment. The policy is one which many governments can afford to adopt, but few to ignore.

HELMINTHIASIS.

LEIPER (R. T.). **Helminthology : a Chapter in Comparative Medicine.** —*Proc. Roy. Soc. Med.* 1933. Dec. Vol. 27. No. 2. pp. 127–134. (Sect. of Comp. Med. pp. 1–8).

The Presidential Address of the Section of Comparative Medicine of the Royal Society of Medicine deals successively with general remarks, " normal parasitism " and " pathological parasitism."

After intimate remarks on the affairs of the Section (such as that it should not, as at present, consist almost entirely of medical men and veterinary surgeons, but should embrace eminent biologists, biochemists and comparative physiologists) a survey is given of helminthological posts and literature. The value of comparative zoology is illustrated by the effect which the knowledge of the development of *Cucullanus elegans*, obtained by LEUCKART, had in his urging FEDSCHENKO to investigate on similar lines the life history of the embryo of the guinea-worm, since the two larvae were identical in structure ; the correlation by STEENSTRUP of the already well-known rediae and cercariae as parts of the life history of trematodes ; and LEIPER's use of apharyngeal cercariae in directing him to elucidation of the life history of schistosomes. Biological races are discussed—of *Ascaris lumbricoides* in man and pig, of *Ancylostoma caninum* and *Dipylidium caninum* in cat and dog, and of *Heterodera schachtii* in various plants.

" Normal parasitism " is described as follows :—

" In many forms of animal life we find that hosts and parasites live together in harmony and that there is a normal biological equilibrium subsisting between them ; the host harbouring a small number of parasites and suffering no ill-effects from their presence. To this condition of peace and amity the host may even make a special contribution, for it has lately been shown that the presence of a small number of helminths may stimulate a physiological response on the part of the host tissues, of a potency just sufficient to prevent the establishment of additional parasites of the same species."

With its description are associated age immunity, acquired immunity, and biological checks, instances being given of all, the last dealing with the manner in which helminth eggs and larvae are destroyed in vast numbers by other organisms.

" Pathological parasitism " is held to be that in which physical injury or excessive parasitism causes damage to the host. The statement " Helminth parasites, as is well known, do not give rise to successive generations within the same host " evidently implies disbelief in the " hyperinfective " strongyloides strains of FAUST, or the definition as ectoparasites of the intestinal larvae which cause them (as well as of all adult worms in the intestinal canal and its adnexa including the pulmonary passages) which though strictly defensible will be apt to confuse. The effect, in producing excessive parasitism, of even such a temporary domicile as a nest is mentioned ; and in considering the spread of infection stress is laid on the effects of domicile imposed by man on himself and his domestic animals, and of the change in Egypt from basin to perennial irrigation which raised human bilharzial infection from 10 to 90 per cent. by its huge increase in the molluscan population. The scope of diet and intercurrent infection in changing " normal " to a " pathological " parasitism is mentioned, as are the mechanical effects produced by parasites both in their normal migrations and when strayed.

"Much remains to be accomplished in the realms of both normal and pathological parasitism, but there has now been accumulated a very considerable body of exact helminthological data which ought to be applied in the field. This transition from the laboratory to the field is always a difficult step, and the student of applied helminthology must not leave entirely to others the practical application of his work until he feels assured that his results are being really effectively used." *Clayton Lane.*

FREUND (L.). Helminthenwanderungen. I. Teil. Die Wanderungen und die "Passagen" der Nematoden im Wirtskörper. II. Teil. Die Wanderungen der Trematoden im Wirtskörper und vom Wirt zum Wirt. [**Helminth Wanderings.**]—*Ztschr. f. Parasitenk.* 1933. Nov. 23. Vol. 6. No. 2. pp. 243–268. With 4 figs. [28 refs.]

A dissertation on the wanderings of helminths within and between their hosts.

I. Regarding nematodes it is concluded that their larvae bore through the intestinal wall into the vascular system as the result of the necessity that they should be nourished by blood proteins [though their boring into, for example, pith, is one of the classical instances of this instinct]. They are transported mechanically in the vascular system and break out of this under the influence of taxies of special organs [*cf.* ASHFORD, PAYNE and PAYNE, p. 391 with their suggested implication of massive larval straying]. This breaking out carries them to the outer world or to organs that communicate with it, thus permitting of perpetuating the species. Special cases are considered and there is restatement of the conclusion that entry into and transportation by a vascular system is a primitive feature and is still retained by most nematodes; and is not to be considered as a wandering but as a passage.

II. The wanderings of trematodes are reviewed. *C. L.*

YENIKOMSHIAN (H. A.) & BERBERIAN (D. A.). **The Occurrence and Distribution of Human Helminthiasis in Syria and the Lebanon, with Case Reports of** *Dicrocelium dendriticum* **and** *Hymenolepis nana* **Infestations.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 425–435. With 1 plate.

An account of helminth infections in Syria and Lebanon.

"1. 3,530 stool specimens were examined for ova of helminths, of which 70 per cent. were positive; 11 per cent showed multiple infestation. Helminthiasis is more frequent in Syria than in the Lebanon.

"2. The rate of infestation with *Ascaris*, *Trichuris*, *Ancylostoma* and *Taenia* varies in different parts of the country. In the northern section and also in the interior of the country ascariasis and trichuriasis are very common. In the coastal zone amongst the workers on banana and orange plantations and gardeners of Hamah and Homs, on the banks of the Orontes and Euphrates, ancylostomiasis is very common, while ascariasis is comparatively rare.

"3. In Beirût and its surroundings *T. saginata* infestation is more common than elsewhere.

"4. 117 cases of *E. vermicularis*, 25 cases of *Trichostrongylus* sp. and 7 cases of *S. stercoralis* infestation are recorded.

"5. 51 cases of *H. nana* infestation are recorded. In many of these signs of irritation of the nervous system were noticed. Some of these cases were clinically cured after the expulsion of the worms.

"6. 18 cases of *D. dendriticum* and 7 cases of *F. hepatica* are recorded. Presence of ova of these flukes in the stools may very well be accidental, due to ingestion of infested liver. Two of the cases of *D. dendriticum* appeared to be true instances of parasitism." *C. L.*

CIUREA (I.). Les vers parasites de l'homme, des mammifères et des oiseaux provenant des poissons du Danube et de la Mer Noire. Premier mémoire. Trématodes, famille *Heterophyidae* Odhner, avec un essai de classification des trématodes de la superfamille *Heterophyoidea* Faust. [**Parasitic Worms of Man, Mammals and Birds from Fish of the Danube, Black Sea, Bessarabia, Dniester.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* 1933. Mar.-June. Vol. 6. Nos. 1–2. pp. 1–134. With 95 figs. on 36 plates. [5 pages of refs.]

——. Sur quelques larves des vers parasites de l'homme, des mammifères et des oiseaux ichtyophages, trouvés chez les poissons des grands lacs de la Bessarabie, du Dniester et de son liman.—*Ibid.* pp. 151–170. With 22 figs. on 13 plates.

These beautifully and profusely illustrated memoirs deal closely with the systematic position, anatomy and life history of the parasites indicated in the titles. *C. L.*

v. BRAND (T.), HOLTZ (F.) & VOGEL (H.). Experimentelle Verkalkung unter dem Einfluss des Calcinosefaktors bei Befall mit tierischen Parasiten. [**Experimental Calcification round Animal Parasites induced by "Calcinosefaktor."**]—*Ztschr. f. Parasitenk.* 1933. Dec. 18. Vol. 6. No. 3. pp. 308–322. With 7 figs. [11 refs.]

Calcification in the tissues round embedded parasites was obtained experimentally by large doses of "calcinosefaktor," an irradiated ergosterin.

In trichinae, calcification appeared in 2 to 3 months, that is, at a shorter interval than it does naturally. Calcification of *Cysticercus pisiformis* occurred in necrotic liver tissue and was perhaps "unspecific." It was also noted in the case of *C. fasciolaris*, *Eimeria stiedae* and schistosome eggs, but only in the last was there lime deposit within the parasites themselves. *C. L.*

MAPLESTONE (P. A.) & CHOPRA (R. N.). **The Toxicity of Tetrachlorethylene to Cats.**—*Indian Med. Gaz.* 1933. Oct. Vol. 68. No. 10. pp. 554–556.

Tetrachlorethylene is much less toxic to cats than is carbon tetrachloride; in therapeutic doses it does not damage organs nor is its toxicity increased by alcohol.

Symptoms appeared (giddiness, drowsiness, restlessness, and some unsteadiness in the hind limbs) only when a dose of 1 cc. per kilo was reached. After 4·5 cc. per kilo all cats recovered, after 5 cc. all died. Doses of 2 to 3 cc. per kilo in 95 per cent. alcohol gave rise to no greater intoxication than did the plain drug. Cats which died had the following lesions—Liver: congestion, fine fatty change, and in one case a little necrosis. Kidneys: in glomeruli congestion, albuminous exudation after higher doses; in tubes, granular and fatty change proportionate

to the dose ; so that " 0·5 ccm. per kilogramme of this drug [carbon tetrachloride] causes incomparably greater damage than does 5 ccm. per kilogramme of tetrachlorethylene." *C. L.*

MAPLESTONE (P. A.) & CHOPRA (R. N.). **The Effect of Hexylresorcinol on Cats.**—*Indian Jl. Med. Res.* 1934. Jan. Vol. 21. No. 3. pp. 519–521.

Unless there is care in selecting patients, accidents are liable to occur after treatment with hexylresorcinol.

Experiments were carried out on cats ; in 12 the drug was dissolved in alcohol, and in 12 in olive oil. With alcoholic solution symptoms appeared when doses were of 1·6 to 3 grains per kilo, namely drowsiness and unsteadiness of the hind limbs with recovery within 24 hours ; when they were of 4 to 5 grains per kilo all cats died. In olive oil toxicity was less severe. As to lesions, which are reported by M. N. DE, doses of 1 grain per kilo did no apparent damage. With 2½ to 5 grains per kilo. there was gastric necrosis, which might extend in the larger doses through half the depth of the mucosa with congestion and occasional haemorrhage and leucocytic infiltration. As to the duodenum, 2½ grains produced hypersecretion, 5 grains per kilo some congestion. In the liver there was in all but one case moderate congestion with slight cellular damage. In the kidneys moderate congestion with slight granular and fatty change in large doses. They add the following report on man :—

" Since the paper by Maplestone and Mukerji (1932) appeared we tried this drug, incidentally without any anthelmintic effect, on a patient with strongyloides infection accompanied by a certain amount of ' indigestion.' The patient although not in any sense endangered from the point of view of loss of life suffered considerable pain and exacerbation of his digestive disturbance, with consequent loss of appetite for some days after his treatment with hexylresorcinol. Apparently the drug considerably increased the already present irritation of the gastric and duodenal mucosa."

C. L.

CHRISTENSEN (B. V.) & LYNCH (H. J.). **The Effect of Anthelmintics on the Host. I. Tetrachlorethylene. II. Hexylresorcinol.**—*Jl. Pharm. & Experim. Therap.* 1933. Vol. 48. pp. 311–316. [12 refs.]

In experimental dogs pathological changes were greater after tetrachlorethylene than after hexylresorcinol.

The experimental procedure was the same in both sets of tests. When using single doses the animals were starved for 24 hours, dosed according to weight, and killed and examined 24 hours later. Multiple doses were repeated fortnightly.

Tetrachlorethylene.—Dosage in cubic centimetres and weight of dogs in kilos were as follows :—1 ; 4·8 : 2 ; 9·7 : 3 ; 12·2, 12·5, 15·9. It was given in soft gelatin capsules in the morning and followed in 4 hours by magnesium sulphate. After a single dose there was considerable depression of heart and respiration, more noticeable after the purge was given. The liver showed mild, and the heart some diffuse, fatty degeneration ; the kidneys appeared undamaged, the small intestine was invariably extremely shrivelled and spongy and showed very marked inflammation. With repeated doses one dog of 7·7 kilos, given doses of 2 cc., died after the ninth dose ; the second of 14·1 kilos,

getting doses of 3 cc., was killed after the fifth ; changes in heart and liver showed the same picture more pronouncedly, damage increasing with the number of doses ; the kidneys were unchanged.

Hexylresorcinol.—Dosage in grams and weight of dogs in kilos were as follows : 0·6 ; 4·2 and 4·3 : 0·8 ; 6·9 and 9·1 : 1·0 ; 11·2. The crystalline drug was given in hard gelatine capsules, with purge as above noted. After a single dose there were no apparent symptoms and no macroscopic changes were visible ; microscopically liver and heart " showed only very slight damage ", the kidneys none. After repeated doses, liver and heart though macroscopically normal showed " a very pronounced degree of damage " ; one of these dogs died 4 days after the 5th dose, the other became sick after the 3rd and was killed after the 4th dose ; in both there was inflammation, necrosis and softening of the small intestine ; in both the kidneys appeared undamaged.

C. L.

GOPSILL (W. L.). **Rotylon as an Anthelminthic.**—*South African Med. Jl.* 1934. Jan. 27. Vol. 8. No. 2. pp. 43–45.

The author's conclusions are that 3 capsules of rotylon caused the passage of a stray ascaris ; 6 capsules caused hookworms to be expelled, 8 caused them to be eradicated.

In all, 17 cases were treated. " Rotylon is an aromatic combination insoluble in water, but soluble in alkalies." The liquid produces burning and prolonged anaesthesia of the tongue ; each gelatine capsule contained 0·4 gm. D.C.F. was used (presumably in all cases) for diagnosis. Symptoms were colic followed and relieved by passage of a stool. A dose of 3 capsules to each of ten men was ineffective ; one of 6 capsules was followed in one case by stools without ova [which had presumably been present before]. Six capsules were given to each of four adults " heavily infected with hookworm " ; one passed 16 worms and became negative for eggs on the fifth day, the second passed 10 worms and later showed no eggs, the third passed no worms, nor did the fourth although eggs ceased to be found. One had 8 capsules and passed 36 hookworms and 1 ascaris, with disappearance of ova. One had 13 capsules and passed no worms. The last had 13 capsules and passed no worms though presumably eggs had previously been found. The consistent use of " ovae " as the plural of ovum is unexpected.

C. L.

LIÈVRE (H.). Résistance de la grande douve du foie à quelques toxiques. [**Resistance of the Liver Fluke to Poisons.**]—*C. R. Soc. Biol.* 1934. Vol. 115. No. 6. pp. 635–636.

The drugs were applied *in vitro* in a 1 per cent. concentration, being added to bile or to Ringer's solution with glucose and kept at 37°C. Survival of the *F. hepatica* was as follows. In hours—stovarsol 5, emetine 4, tartar emetic or methylene blue 2½, methylene blue 1½, extract of male fern 1½. In minutes, quinine 50, gentian violet 40, pelletierine 15, thymol 1½. In less concentration results were poor, and it is noted that the concentration in the body must be much less. [To accept the relative figures for medical practice implies the belief that it is the chemical substance which is swallowed that acts as an anthelmintic.]

C. L.

TAYLOR (E. L.). **The Production of Malformed Eggs by Immature** *Fasciola hepatica.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Mar. 12. Vol. 27. No. 5. pp. 499–504. With 3 figs.

The point of medical interest in this paper lies in this and other instances where malformed eggs have been found in young flukes, a matter which may prove to have a value in indicating that infection is recent. *C. L.*

HOUDEMER (E.). Au sujet d'une coutume favorisant l'infestation des Indochinois par *Clonorchis sinensis* (Cobbold, 1872). [**A Custom favouring Infestation of Indochinese by** *Cl. sinensis.*]—*Bull. Soc. Path. Exot.* 1934. Jan. 10. Vol. 27. No. 1. pp. 21–23.

An entertaining paper describing methods of preparing and eating raw fish, locally esteemed a delicacy.

Clonorchis infection is locally present in 1·4 to 40 per cent. of human beings, in 10·94 per cent. of dogs and 32·83 per cent. of cats. Fish is eaten raw. The larger kinds are scaled, cleaned, filleted, cut into pieces 1 to 4 cm. long, carefully dried between two bits of paper, dipped in an acid, salt, or sugary sauce, sprinkled with rice or grated sesame, mixed with powdered ginger, wrapped in some aromatic leaf and so eaten. The small *Carassius auratus*, however, swims about in a bowl beside the feaster who when disposed fishes for it with a landing net or scoop, seasons it in the method he prefers, and eats it still wriggling. For public education, as a preventative, public places and schools should, it is suggested, be placarded with humorous posters. *C. L.*

VAN HOOF (L.). Un cas de distomatose pulmonaire au Congo Belge. [**Case of Paragonimus Infection in Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1933. Dec. 31. Vol. 13. No. 4. pp. 473–478. With 3 figs.

A case of paragonimus infection in one who had never left the Belgian Congo, evidenced by clinical, laboratory and X-ray findings.

A native man with vague pains in the right side of the thorax contracted sleeping sickness in the Lower Congo, was treated with tryparsamide, developed haemoptysis, and at Leopoldville no tubercle bacilli but trematode eggs were found in the sputum. They averaged 87·1μ by 52·5μ with minima of 77μ by 42μ and maxima of 100μ by 60μ. They were brownish, operculated, thickened at the lower pole, in fact corresponded to paragonimus eggs, and are pictured. Reference is made to LIBERT's case in the Cameroons [this *Bulletin*, Vol. 29, p. 412.] *C. L.*

RODHAIN (J.) & VAN HOOF (M. T.). Essais de chimiothérapie antihelminthique. [**Anthelmintic Chemotherapy.**]—*C. R. Soc. Biol.* 1934. Vol. 115. No. 2. pp. 192–194.

The lung fluke of the frog *Distomum cylindraceum* Zinder, was treated with a view to a lead towards the treatment of paragonimus in man.

Even when the doses sufficed to kill the host they left the flukes alive. The drugs tested were potassium tartrate, emetine, Dn 7, fouadin, carbon tetrachloride and tetrachlorethylene ; orally, hypodermically or intraperitoneally. *C. L.*

TUBANGUI (Marcos A.) & PASCO (Antonio M.). **The Life History of the Human Intestinal Fluke,** *Euparyphium ilocanum* **(Garrison, 1908).** —*Philippine Jl. Sci.* 1933. Aug. Vol. 51. No. 4. pp. 581–606. With 4 plates & 1 fig. [18 refs.]

The life history of this fluke is as follows :—

The miracidium, freed from the evacuated egg after development at room temperature for 9 to 20 days or more, enters the first intermediate host, *Gyraulus prashadi* Faustino, a small fresh-water planorbid. From it the cercaria escapes after 42 to 50 days and enters another snail, apparently any of the Philippine fresh-water snails, including the primary intermediate host. Of these *Pila luzonica* is that most commonly eaten by man, and is therefore probably the most important hygienically. Experimentally the metacercaria which develops in the secondary intermediate host has been successfully fed to clean laboratory white rats, a cat and 2 monkeys, and unsuccessfully to young pigeons and a pup. The cercaria, metacercaria and adult have 51 collar spines in 2 alternating rows uninterrupted dorsally. Prevention consists in proper faecal disposal and avoidance of eating imperfectly cooked snails. *C. L.*

RAO (M. Anant Narayan). **A Preliminary Report on the Adult Trematode obtained from** *Cercariae indicae* **XXIII Sewell, 1922.**—*Indian Jl. Vet. Sci. & Animal Husbandry.* 1933. Dec. Vol. 3. Pt. 4. pp. 317–320. With 4 figs. on 1 plate & 1 text fig.

Except in size (it measures 2 to 4·5 mm. by 0·75 to 1·2 mm.) the adult form seems to tally with *Euparyphium malayanum* Leiper, 1911.

The cercariae were present in 42·8 per cent. of 1883 *Limnea leuteola*, metacercariae in wild *Planorbis exustus*, *Limnea leuteola* and on the gills of *Barbus stigma*. The last forms were fed to the dog and adults were recovered from its intestine. The investigation started because Rao had found these flukes in 1931 in the intestine of a dog. *C. L.*

RAMSAY (G. W. St. C.). **Routine Examination of the Urine in Areas in which** *S. haematobium* **is Endemic : a Consideration of the Significance of Certain Abnormal Constituents.**—*West African Med. Jl.* 1932. July. Vol. 6. No. 1. pp. 3–4.

It is concluded that a routine examination of the urine can be carried out so as to display all cases infected with *S. haematobium*.

The examination consisted in standing urine for 5 minutes and then centrifuging the bottom 7 cc. for 3 minutes at 1,500 revolutions a minute. There were examined 2,174 males of which 33·9 per cent. showed ova. Of these 737 cases, 689 showed erythrocytes, while these were present in 338 of 1,437 who showed no ova. It is felt that this statement does not make the matter clear enough and that it is necessary to call in the following equation to show that the coefficient of association is high, namely 0·93, and that the presence of blood is a fair index of infection.

$$C = \frac{(AB)\ (ab) - (Ab)\ (aB)}{(AB)\ (ab) + (Ab)\ (aB)}$$

where A=ova present, B=blood present, a=ova absent, b=blood absent, and C the coefficient.

C. L.

DIXON (Patrick K.). **Age Incidence of Schistosome Infection : and Species of Malaria Parasite in Katanga.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Mar. 12. Vol. 27. No. 5. pp. 505–506.

Schistosomiasis.—Of 1,343 urinary examinations eggs of *S. haematobium* were found in 8·6 per cent. (no schistosome eggs were found in about the same number of faecal examinations). Incidence was highest between 10 and 15 years, no infections being found after 45. It is therefore believed that immunity is acquired fairly rapidly.

Malaria.—Since examination was made by native orderlies no diagnosis of *P. vivax* was accepted unless gametocytes or rosettes were found and no mixed diagnosis unless crescents were present in addition. Diagnosis was thus weighted against *P. vivax* ; but even so, in 1,413 cases *P. vivax* was found alone in 13·6 per cent. and in conjunction with *P. falciparum* in 3·7 per cent. In Elisabethville, 150 miles off, WALRAVENS found less than 3 per cent. of *P. vivax* infection, a figure confirmed by other workers in that town. Clinically the two infections were similar. To plasmochin the gametocytes of *P. vivax* disappeared more rapidly than those of *P. falciparum.* *C. L.*

HASHIM (M.). **Pathological Lesions of the Gall-Bladder associated with Ulcerations and Bilharziasis of the Intestine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 399–407. [11 refs.]

A histological demonstration of schistosomiasis and amoebiasis in the gall bladder itself.

Of 280 autopsies 82 showed obvious intestinal lesions, 43 being bilharzial, and in six of the latter schistosomiasis of the gall bladder occurred. Ova identified as those of *S. mansoni* were found in all six, of *S. haematobium* in two. This is believed to be the first time such ova have been reported from the gall bladder itself. In two the fibromuscular coat was implicated, in one the subperitoneal, in one the mucosa, and in two the submucosa with spread to the mucosa and lumen. In two, bilharzial hepatic cirrhosis was present.

The gall bladder was involved in 6 more of the 82 cases ; one showed catarrhal inflammation of gall bladder and stomach and hepatic cirrhosis, one had typhoid, one acute bacillary dysentery, one acute duodenitis with colonic schistosomiasis, one multiple pyaemic hepatic abscesses, and one showed amoebic abscess of the liver with *E. histolytica* lodged in the mucosa of the gall bladder. *C. L.*

BOUCHER (H.). Etude du sang et des urines de trois bilharziens par les colorations vitales (rouge neutre, vert janus et bleu crésyl brillant). [**Study of Blood and Urine by Vital Stains in Three Schistosome Infected Persons.**]—*Bull. Soc. Path. Exot.* 1934. Feb. 14. Vol. 27. No. 2. pp. 173–175.

On these 3 cases the conclusion is suggested that eosinophils are not merely a test of intolerance to parasitism but that they intervene actively in defence.

With Janus green no great success was achieved but with both neutral red and cresyl brilliant blue eosinophils at blood temperature were most active, moving at a rate of 60μ in a few seconds, 10 per cent. being still active in sealed preparations after 16 hours at 35°C. *C. L.*

CAWSTON (F. G.). **The Treatment of Bilharzia Infection.**—Reprinted from *Med. Press & Circular.* 1934. Jan. 10. Vol. 188. No. 4940. pp. 37–39.

Essentially a plea for treatment sufficient to kill male worms.

The passing of dead eggs signifies at most death of female worms. It tells nothing regarding the more resistant males which themselves are presumably still present in cases where symptoms fail to improve. The use of eosinophil counts and complement fixation reactions is urged and comment is made on their absence from present records. Antimonium potasssium tartrate is again advocated in a month-long course, repeated if need be after an interval. It is, however, apt to be less effective if an insufficient course of fouadin has already been given, *e.g.*, one terminated when dead eggs are passed. *C. L.*

CAWSTON (F. G.). **The Testing of Treatments for Bilharzia Disease.**—*Jl. Trop. Med. & Hyg.* 1934. Jan. 15. Vol. 37. No. 2. pp. 22–24.

Cawston reviews the subject and concludes as follows :—

" Toxic effects from antimony therapy may be avoided by using skilfully regulated doses of the potassium salt in fresh solution.

" Toxic effects may be due to excessive doses ; but, when ampoules of antimonium sodium tartrate or fouadin are favoured, they may sometimes be explained by the sodium content." *C. L.*

FRÉGONNEAU (Werner). Erfahrungen mit der Fuadin-Behandlung bei Schistosomiasis. [**Fouadin Treatment of Schistosomiasis.**]—*Arch f. Schiffs- u. Trop.-Hyg.* 1933. Dec. Vol. 37. No. 12. pp. 515–528.

Fouadin is held cheaper and better than tartar emetic.

In 124 cases the total dose was nearly always 45 cc., usually given in 9 or 10 daily injections. In 96 the urine was clear at the end of the course and in 36 of them later investigation confirmed this, in 7 it was clear after 14 days, in 14 there were living and degenerate eggs at the end of the course but none 4 to 14 days later, in 1 there were erythrocytes at the end of the course but normal urine 4 weeks later.

As to side effects, 89 had none, 30 vomited generally after the 7th injection. There was occasional smarting at the site of injection, and sometimes slackness. An exhaustive table accompanies the paper. *C. L.*

HILL (Rolla B.) & TEJERA (Enrique). Esquistosomiasis en Rincón del Valle (Venezuela). [**Schistosomiasis in Rincón del Valle (Venezuela).**]—*Medicina Países Cálidos.* Madrid. 1933. Nov. Vol. 6. No. 6. pp. 450–454. French summary (3 lines).

An account of the prevalence of this infestation in 1929 in the district of Rincón del Valle. The existence of schistosomiasis (*S. mansoni*) in Venezuela has been known for several years. In 1917 ITURBE called attention to an endemic focus of it in Federal District, and in the previous year RISQUEZ found the adult worm in 19 out of 86 autopsies

on patients mostly from Caracas. In the same year ITURBE and GONZALEZ found 30 per cent. of 400 specimens of *Planorbis guadalupensis* containing cercariae indistinguishable from those of *S. mansoni* [this *Bulletin*, Vol. 10, p. 114].

The authors considered it would be interesting to re-examine persons in the Rincón del Valle district. They obtained faecal specimens from 200 individuals of all ages up to 60 years. The district is a suburb of Caracas, about 1 kilometre south of the river Guaire and separated from it by a chain of small hills. Of the 200, 63 were positive, 31 of 87 males, 32 of 113 females. Almost half, 98, were under 15 years of age, and 38 of these were positive, the heaviest infection being 17 out of 27 between 10 and 15 years.

Of 100 specimens of *Planorbis guadalupensis* 25 were infected with the cercariae. Incidentally, other helminthic infestations were recorded among the same 200 persons; 117 or 58·5 per cent. were passing ova of Trichuris, 91 (45·5) those of Ascaris, and 35 (17·5) those of Necator; altogether parasitism was present in 178 or 89 per cent.

H. H. S.

FAUST (Ernest Carroll). **Studies on Schistosomiasis mansoni in Puerto Rico. I. The History of Schistosomiasis in Puerto Rico.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1933. Dec. Vol. 9. No. 2. pp. 154–161. [25 refs.] [Spanish version pp. 162–168.]

This is the first of a series of seven articles, dealing with Mansonian schistosomiasis, which it is proposed to publish in consecutive numbers of this journal.

Its subject does not lend itself to abstract. The infection was first reported in Porto Rico by GONZALEZ MARTINEZ in 1904 when he found lateral-spined eggs in the faeces, while later in the year he recovered 219 schistosomes from the portal vessels of a patient. In January 1905 he forwarded worms to BLANCHARD with the suggestion that schistosomes producing enteritis and having lateral-spined eggs discharging in the faeces belonged to a new species. That species was, however, constituted by SAMBON in 1907. At various times percentages of infestation for Porto Rico have been published and have varied between 7·35 and 17·2. Diagnoses by skin reactions and from Banti's disease and other pyrexias, are mentioned. *C. L.*

PONS (J. A.) & HOFFMAN (W. A.). **Febrile Phenomena in Schistosomiasis mansoni with Illustrative Cases.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1933. Sept. Vol. 9. No. 1. pp. 1–17. With 9 charts. [Spanish version pp. 18–30.]

Since rectal schistosomiasis is neglected as a local cause of fever, 7 cases are cited where this was a marked feature.

The diagnostic points were—bathing or wading in a stream in an endemic area, two hours afterwards itching, indefinite ill health for a week or two, sudden rigors and fever, taking various courses and often with bronchial irritation or apical infiltration, tenderness along the colon with tenesmus and frequent dysenteric stools, enlarged and tender liver, enlarged spleen, leucocytosis and eosinophilia, and at long last ova of *S. mansoni* in the stools. *C. L.*

GOPSILL (W. L.). **Notes on the Occurrence of Rectal Bilharziosis in the Cholo District including Certain Eye Changes Common to both Rectal and Urinary Bilharziosis.**—*Ann. Med. Rep. on Health & Sanitary Condition of Nyasaland Protectorate for Year ending 31st December, 1932.* Appendix III. pp. 63–64.

Gopsill continues his observations and contrasts them with those of the adjoining Lower Shire District (see this *Bulletin*, Vol. 30, p. 208).

Of 325 inpatients 30 per cent. showed eggs of *S. mansoni*, all in the faeces ; and 20 per cent. showed those of *S. haematobium* in the urine and once in the faeces. Fever might occur after the third of a series of antimony tartrate injections, but if so the blood practically always contained malaria parasites. Conversely a case of severe malaria treated intravenously with quinine (gr. v) had blackened, disintegrated ova in his stools, though quinine by mouth seemed to have no such effect. Eosinophils varied from 2 to 30 per cent., but in 100 hookworm-infected controls was never over 6. Conjunctivitis was aggravated by antimony tartrate, but cleared up under emetine. The value of the history of a week's bright red stools, perhaps years earlier, is again stressed as indicating the onset of bilharzial infection. The eye changes, mentioned in the earlier report as helping a diagnosis when ova are scarce, are more exactly described thus : " Congestion of the perforating branches of the anterior ciliary arteries, together with a microscopical change in the colour at the end of the arteries, somewhat resembling a bruise, but differing therefrom in the fact that the colour is blackish blue, and does not go through the changes seen in a bruise. In some cases as many as six blue patches occurred scattered about the sclera, in both the upper and the lower portions." *C. L.*

PEASTON (H.). **Preliminary Note on a Focus of *S. mansoni* Infection in Sierra Leone.**—*Ann. Trop. Med. & Parasit.* 1933. Dec. 20. Vol. 27. No. 4. pp. 497–499.

A focus of *S. mansoni* infection has been found at Kabala, Northern Province, Sierra Leone.

A stream here contains *Lymnaea elmeteitensis*, *Bulinus forskali* and a *Planorbis* whose identity is being investigated but which has emitted cercariae of " human type." Since then the stream bottom has been cleared, with great diminution of Lymnaea and Planorbis. *C. L.*

BIGGAM (A. G.), HASHIM (M.) & GHALIOUNGUI (Paul). **Treatment of Papilloma by Diathermy in Intestinal Bilharziasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 409–412. With 1 plate.

The pathology and clinical picture of intestinal schistosomiasis are briefly outlined, and treatment of papillomata by diathermy is described.

The reproduction of an X-ray negative shows how papillomata may be shown up, as filling defects, in a colon partially distended by a barium enema. These lesions persist after adequate antimony treatment and should be attacked by diathermy through a sigmoidoscope. The treating electrode consists either of a pair of spoon-shaped terminals closed by a trigger, or of a loop of wire. The inexperienced should determine by experiments on meat or heart muscle the amount of current needed, for too much may injure the intestinal wall with serious

results. Many papillomata may be treated at a sitting and this may be repeated weekly. The treatment is painless, has given rise to no serious haemorrhage in the author's hands, and has got rid of the dysenteric symptoms which characterize the condition. *C. L.*

PAKIAM (A. X.). **A Short Note on the Epidemiology of** *Schistosoma japonicum* **Infection among Immigrant Chinese in Malaya.**—*Malayan Med. Jl.* 1933. Dec. Vol. 8. No. 4. pp. 294–295.

Search of post-mortem records at the Tan Tock Seng Hospital, Singapore, suggests that the Min River, Fukien Province, and the territory round it is an endemic focus of *S. japonicum*. *C. L.*

PENSO (Giuseppe). Sulla presenza di *Planorbis Boissyi* (Potiez e Michaud, 1838) var. *libica* (v.n. Penso 1933) in Tripolitania. [*Planorbis boissyi* **var.** *libica* **in Tripolitania.**]—*Arch. Ital. Sci. Med. Colon.* 1934. Feb. 1. Vol. 15. No. 2. pp. 112–117. With 2 figs. English summary (5 lines).

In Tauorga, near Misurata, Tripolitania (Northern Africa) is a small endemic focus of urinary schistosomiasis. The only mollusc found was a Planorbis—the genus usually associated with the rectal form, *S. mansoni*—which differs from *P. boissyi* in the following particulars [constructed from the text] :—

P. boissyi.	*P. boissyi var. libica.*
Inferior surface umbilicated. Shell yellowish-brown or greenish.	Both surfaces umbilicated. Shell yellowish-grey, never brown or greenish.
Peristome has notched margin, and lower part almost straight.	Peristome much more oblique, margin linear, sharp, not notched.
Diameter of terminal spiral is to the penultimate as 3 : 1.	Diameters are as 4 : 1.
Total diameter of shell 12–16 mm. with average of 13 mm.	Total diameter varies between 9 and 14 mm. with an average of 12 mm.

[Nowhere in the article is found any statement to show that this species was an intermediate host of the Schistosome (except that no Bulinus was seen), nor does it appear that any experimental work was undertaken to test this vital point.] *H. H. S.*

HELMY (M.). Rôle du réservoir d'Assouan dans la dissémination des *Bullinus* en Egypte. [**Part played by the Assuan Reservoir in the Spread of Bulinus in Egypt.**]—*Bull. Soc. Path. Exot.* 1933. Dec. 13. Vol. 26. No. 10. pp. 1265–1267. With 2 figs.

Bulinus* is not confined to terminal irrigation canals in Egypt but is carried to Egypt from the sudd marshes and the lakes which form the sources of the Nile.

The snails are found within the zone of the Assuan barrage, not in the main mass of water but on the " shara " plant abundant in creeks and bays formed by the dammed up water. They live on the masses of *Potamogeton crispus* equally in Egypt, the Sudan and south of this, and these are swept down, with the annual flood, to Lower Egypt. *C. L.*

*As BAYLIS has pointed out (*Ann. Trop. Med. & Parasit.*, 1931, Vol. 25, p. 369, see this *Bulletin*, Vol. 29, p. 408) the proper form of this generic name is *Bulinus* Müller, 1781, *Bullinus* being a variant introduced by OKEN in 1815. *C. L.*

MacArthur (W. P.). **Cysticercosis as seen in the British Army, with Special Reference to the Production of Epilepsy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 343–357. With 1 text fig. & 6 figs. on 4 plates. Also in *Jl. Roy. Army Med. Corps.* 1934. Apr. Vol. 62. No. 4. pp. 241-259. With 7 figs.

The title was chosen, not as suggesting that this important disease is peculiar to the Army, but because MacArthur's experience has been limited almost entirely to soldiers serving or discharged.

About 100 soldiers are yearly discharged from the army for "epilepsy"; during 1933 twenty cases of cysticercosis were identified at Millbank; during the past trooping season eight were so identified, 6 having been invalided as epileptics and the 2 others as having had some kind of seizure. Since most of these cases have no history of tapeworm and presumably have never harboured one, the incubation period cannot be fixed; where *Taenia solium* (which provides the cysticercus under discussion) has been present, symptoms have first shown themselves when the man was in hospital for treatment for this, or at any time up to several years later. Prodromal symptoms have been headache, fever, myalgia or muscular swellings; or symptoms may be entirely absent in men with advanced muscular infection. Palpable cysts may be few or many, they may appear singly or in crops, may increase, decrease and disappear; sudden increase, judging by excisions, means death of the embryo, and in the brain probably implies appearance of symptoms. Actually the changes round cerebral cysts are—marked cellular response to a breadth of about 3 mm., necrosis if the patient survives, and later perhaps enclosure by neuroglia sclerosis. As X-rays show, the scolex may calcify and later the cyst wall, which in muscle is elongated in the direction of the fibres, but in brain is globular for the pressure there is equal on all sides. The interval between the cyst's death and calcification of the scolex is put at about 3 years in muscles, but considerably longer in the brain. Apart from a diagnosis of epilepsy, cerebral cysticercosis has passed as hysteria, cerebral tumour, disseminated sclerosis, acute encephalitis, melancholia, acute mania, delusional insanity and dementia praecox. The men are apt to be careless, untrustworthy and undisciplined. One type passes into another; "an early emphatic entry, '*NO FITS*,' does not preclude a final one 'Died in status epilepticus'."

As regards diagnosis, a minute examination from head to foot of a stripped man may disclose no nodules. Eosinophilia, and skin and complement fixation tests may be negative even with heavy infections. Examination of an excised cyst clinches the matter, but apart from that repeated examinations are essential in doubtful cases. Although diagnosis benefits the man himself but little, the presence of cysticerci gives him material gain when it has been caused by service abroad, it gives him great mental ease when he can be assured that there is no chance of epilepsy appearing in his children, and when mental deterioration necessitates his certification as insane it carries to his relatives no slur of familial lunacy. The most dangerous time is from the 6th to 8th year after presumed infection. As a rule there is steady mental deterioration, yet mental alertness may accompany persisting epilepsy and in a few cases fits have ceased. In treatment the fact that many and widespread cerebral cysts are the rule points away from surgery, unless there is some *persistent* localizing sign; and should any parasiticidal drug be found it might well make matters worse. Of

indigenous cysticercosis in England there is no evidence, but MacArthur thinks that surprising results might follow a general inquisition on epileptics.

In discussion: Sir Leonard ROGERS had found cysticercosis common in Calcutta. The experience of Hugh CAIRNS gave no support to cerebral operation, for cysts were many; yet papilloedema was quite slight. W. Aldren TURNER pointed out the importance of considering cysticercosis in epilepsy developing after the age of 30. D. B. BLACKLOCK quoted STEPHENS's investigation of habitat (105 brain, 30 muscle, 2 skin) and concluded either that the skin was more commonly infected now than formerly or that many brain cases remained undiscovered. A. E. HAMERTON reported the presence of cysticerci in the spinal cord, with spastic paraplegia, in animals in the Zoological Gardens. Hamilton FAIRLEY pointed out that the logical sequence of the theory propounded by Col. MacArthur was that cysticerci should be kept alive as long as possible—specific drug therapy was definitely contra-indicated. Serological tests had been disappointing, as contrasted with those on hydatid cysts, schistosomiasis and loa infections. F. P. MACKIE detailed certain investigations which should be taken in India to throw light on the matter. In reply Colonel MacArthur reported one patient after high papilloedema who had died blind; body cysts were often absent, and might be absorbed completely or easily overlooked; the fluid in cysts was clear with only a few degenerate cells and no eosinophils; the points brought up by Colonel MACKIE were being investigated. An agency transmitting amoebic cysts might be effective in conveying onchospheres of *T. solium.* *C. L.*

MORRISON (W. K.). **Cysticercosis in Twin Brothers aged 13 Years with a Radiological Study of the Calcified Cysticercus in Twelve Cases.**—*Brit. Med. Jl.* 1934. Jan. 6. pp. 13–14. With 1 fig.

Cases recorded as illustrating the importance of considering cysticercosis when there are epileptiform fits.

A boy born in 1920, first fit at 18 months, second at 3½ years, went to India in 1926, returned 1928, third fit 1931, fourth 1932, fifth and sixth 1933; X-rayed in 1933 to determine condition of pituitary fossa, with disclosure of 9 cysticercus-like shadows in the brain; further X-rays showed 23 in the limbs; had never had a tapeworm; no nodules. His twin brother showed one cysticercus-like shadow at right base of neck; no nodules; had a tapeworm on board ship on the way home, cured in 1929; no fits. Mother radiographed with a negative result. The figure shows the varied X-ray appearance of cysticerci. The diagnosis is dealt with. [Did he, then, obtain his infection in England?] *C. L.*

i. YOSHINO (K.). **Studies on the Postembryonal Development of** *Taenia solium.* **Part II. On the Youngest Form of** *Cysticercus cellulosae* **and on the Migratory Course of the Oncosphaera of** *Taenia solium* **within the Intermediate Host.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1933. Nov. Vol. 32. No. 11 (344). [In Japanese pp. 1569–1586. With 19 figs. on 2 plates. [37 refs.] English summary pp. 155–158.]

ii. ——. **Part III. On the Development of** *Cysticercus cellulosae* **within the Definite Intermediate Host.**—*Ibid.* Dec. No. 12 (345). [In Japanese pp. 1717–1736. With 3 text figs. & 18 figs. on 2 plates. [22 refs.]. English summary pp. 166–169.]

These two papers carry on the description of development from the stage already reported [*ante*, p. 117] to that of infectivity.

i. The first describes development up to 12 days and 13 hours in the pig. Onchospheres, freed in the upper part of the small intestine enter the mucosa in 15 to 48 hours, shedding their hooks in the process, and reach organs and muscles in 24 to 72 hours. These youngest cysticerci when seen in the intestinal wall, generally in the mucosa, are greyish white, measure 0·021 to 0·03 mm., and consist of round cells, with congested vessels in the tissue about them ; they are rarely found in the abdominal cavity. In internal organs at 24 to 72 hours they are light-greenish and grow to about 0·03 by 0·055 mm. In the liver at 72 hours they are found in the blood vessels. After 6 days, 15 hours they are generally still solid, lying in organs and muscle and measuring about 0·4 by 0·3 mm., having an outer membrane which surrounds polymorphic cells with protoplasmic processes, and centrally showing a myxomatous stellate appearance with gradual degeneration into liquid. At 12 days 15 hours the cysticerci are " remarkably large and cystic," the fluid is sticky, the cyst wall thin, consisting of a cuticle and subcuticle with an accumulation of ovoid cells at one spot ; they are found in liver, brain and muscles (skeletal and cardiac, cell distribution suggesting that they have migrated a short distance between fibres). The whole picture leads to the conclusion that most of the onchospheres which enter the intestinal wall are carried by the blood stream to organs and muscles, those dying which pass on into the abdominal cavity.

ii. This paper carries on the detailed development till infectivity is reached at 60 to 70 days after infection, by which time the bladder measures 5·6 to 8·5 mm. by 3·1 to 6·5 mm., though growth does not then cease. At 20 to 30 days the rudiment of the scolex and its receptaculum become distinguishable, at 40 to 50 days there are 4 suckers and a hook-bearing rostellum. The histological details of growth are dealt with, and it may be mentioned that at 40 days the rostellum bears needles, which gradually take on a curve and the shape and arrangement of the adult hooks. *C. L.*

YOSHINO (K.). **Experimental Studies on the Formation of the Scolex of** *Taenia solium.—Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1933. Dec. Vol. 32. No. 12 (345). [In Japanese pp. 1737–1750. With 11 figs. on 1 plate. English summary pp. 169–171.]

Development from the cysticercus was watched in various media and followed in hosts.

Complete evagination of a scolex in a cysticercus can rarely be effected, but evagination is completed in 4 to 24 hours at 38°C in artificial intestinal juice or " in salt solution of a certain concentration." In dogs evagination is completed in the intestine 3 hours after swallowing the cysticercus, and the structure is that of the adult worm except for the remains of the cavity in which the unevaginated head had lain. Evagination is effected by the movement of the creature, and microphotos show the scolex alive in artificial gastric juice or in the intestine of the experimental dog after 254 days, with the strobile about 1·5 cm. long in each case. *C. L.*

MILLER (Harry M.), Jr. **Specific Immune Serums as Inhibitors of Infections of a Metazoan Parasite** (*Cysticercus fasciolaris*).—*Amer. Jl. Hyg.* 1934. Jan. Vol. 19. No. 1. pp. 270–277.

" These studies demonstrate that it is possible to arrest an infection of the larval cestode, *Cysticercus fasciolaris*, in the rat, by means of

serum from infected rats. If it is found that other species of hosts can be immunized against their larval cestode parasites it may be possible to prevent the development of the larvae by similar means. If this should prove to be feasible, it may be, in the case of a relatively slow-developing form like *Echinococcus granulosus*, that immune serums can be used effectively at longer intervals after infection than is the case for *C. fasciolaris*, which grows relatively rapidly." *C. L.*

JOYEUX (Ch.). Les données parasitologiques concernant le kyste hydatique du poumon. [**Hydatid Cysts of the Lung : Diagnosis.**] —*Arch. Méd. Gén. et Colon.* 1932. May. Vol. 1. No. 5. pp. 277–283.
OLMER (D.). Eléments du diagnostic clinique du kyste hydatique pulmonaire.—*Ibid.* pp. 284–290. With 8 figs. on 2 plates.
BERTHIER (J.). Kystes hydatiques du poumon. Etude radiologique et examens de laboratoire.—*Ibid.* pp. 291–297. With 8 figs.

Joyeux considers the zoological position and epidemiology of the hydatid ; according to DÉVÉ 8·5 per cent. and to MADELUNG 11·9 per cent. of cysts in man are pulmonary. Microscopic examinations of the sputum are considered, and precipitins, complement fixation (varying in success from 17 per cent. by LEMAIRE and THIODET to 84 per cent. by FAIRLEY), and intradermal reactions.

Olmer in dealing with clinical diagnosis notes that a pulmonary cyst is generally single and slow growing ; dyspnoea, cough, pain and haemoptysis may be absent ; so may be dullness if there is lung to the depth of 5 cm. over it. Pleural and general signs are considered, as are those following rupture or infection of a cyst.

Berthier emphasizes that the X-ray shadow is rounded and clear cut as if drawn by a pair of compasses. The differential diagnosis with pulmonary tumours is considered and illustrated by plates. The well-known microscopic evidence is marshalled. *C. L.*

DÉVÉ (F.). L'échinococcose secondaire expérimentale de la souris blanche. [**Experimental Echinococcosis in the White Mouse.**] —*C. R. Soc. Biol.* 1933. Vol. 114. No. 31. pp. 455–456.

Intraperitoneal inoculation of " hydatid sand " produces in white mice a pathological picture sufficiently consistent to be of use in estimating the results of drug treatment.

The course of such infection up to 3 months has already been reported (*ante*, p. 121). The present note deals with the condition of 4 mice 162, 163, 200 and 200 days after inoculation. Cysts covered the whole surface of the peritoneum but were absolutely limited thereto ; and this cavity also was packed with detached cysts, each of which was covered by a living fibro-cellular membrane containing lymphocytes, large mononuclears with nuclei more or less pycnotic, fibroblasts, fibrocytes, histiocytes, very few polynuclears, but absolutely no eosinophils and no giant cells. *C. L.*

JOYEUX (C.), BAER (J.) & MARTIN (R.). Recherches sur les sparganoses. [**Researches on Sparganosis.**]—*Bull. Soc. Path. Exot.* 1933. Nov. 8. Vol. 26. No. 9. pp. 1199–1208. With 1 fig.

The discussion leads to the suggestion that *S. proliferum* is perhaps a teratological form induced by growth in a non-optimum host.

The paper is in the nature of a report preliminary to a monograph. Having listed the species of the two subgenera of *Diphyllobothrium*, namely *Diphyllobothrium* and *Spirometra*, facts collected from experiments with *D.* (*S.*) *mansoni* and *D.* (*S.*) *erinacei europaei* are related, particularly those dealing with the question whether proliferation occurs. Perhaps the basic consideration of the authors is the number of calcareous corpuscles which occur in a square of a definite but unstated size. These are 80 to 100 in the anterior extremity and 1·7 to 12·4 in the posterior. Fairly often a sparganum divides into fragments, which may die or remain lively and motile, but if alive never have the density of calcareous corpuscles exhibited by the scolex. Experimentally beheaded spargana of both species have been injected into the abdominal cavities of various animals and on 36 occasions have been found alive on autopsy up to 123rd day (in the white rat), but never has a scolex been re-formed, judging by the criterion mentioned. Even in a series of experiments with a calcifying regime, namely excess of vitamin D and Osborne's salt (NaCl 100, Ca^3, $(PO^4)^2$ 110, magnesium citrate 65, citrate of iron 10, iodine 0·05, KI 0·1) there was no significantly greater calcification than in controls. Moreover a condition which must be distinguished from proliferation is the finding of spargana in pairs, as for instance has been the case in the guineapig 15 days, and in the tree-frog *Hyla arborea* 50 days, after infection by feeding—periods judged too short for attainment of the condition which simulates duplication by proliferation. Certainly bifurcated or ramified forms may be produced (two photographs testify to this) but not a scolex, and so the suggestion is made that *S. proliferum*, which has been found only in man, so that no further development can be expected, is a monster growing in an unsuitable environment. *C. L.*

i. Houdemer, Dodero & Cornet. Les sparganoses animales et la sparganose oculaire en Indochine. [**Animal Sparganoses and Ocular Sparganosis in Indo-China.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 425–451. With 4 figs. [25 refs.]

ii. Cornet (Emmanuel). Essai de traitement de la sparganose retro-bulbaire. Deux cas et deux succès. [**Treatment of Retro-Bulbar Sparganosis.**]—*Ibid.* pp. 452–455. With 4 figs.

i. Sparganosis is considered in detail and cases illustrating new points are added.

Only *S. mansoni* is in question here. The differences in the developmental cycles of *S. mansoni* and *S. proliferum* are pointed out, as well as the fact that ocular sparganosis is obtained by the application over inflamed eyes of eviscerated frogs and reptiles, though a list of 30 hosts, mammals, birds, reptiles and batrachians, shows how ubiquitous is sparganum infection. The tissue reaction is not due to bacterial entrance with the sparganum for the nodule contents are sterile, but probably to the activity which the heat of a warm-blooded animal induces in the helminth. The habitat in animals is various and not limited as in man; when a sparganum is swallowed the posterior part is digested, but in a favourable host the anterior part grows into a tapeworm, and in an unfavourable one becomes re-encapsuled. Prevention lies in giving up frog poultices, in periodic anthelmintic treatment of domestic dogs and cats, and in the burning of the viscera of all dead ones. The clinical aspects and symptoms are dealt with. An eosinophilia may

be produced. Lesions consist of fibrous nodules, surrounding parasites or their remains, fibrous tunnels connecting the nodules, and a semilardaceous fibrosis surrounding the whole. The wall of the focus consists of 4 layers, from within out: fibrin enclosing lymphocytes, polymorphs being very rare; loose tissue containing giant and fixed cells and haematoidin crystals (the last also found in the inmost layer); lymphocytes, plasma cells and vessels; an outer stratified fibrous layer. Manifestations appear 2 or 3 days after infection. The differential diagnosis is considered. Treatment is essentially surgical by extirpation, but [by calling out what seems to be a thermotaxy] through application of heat it seems possible to entice parasites which have been left behind to come to the surface.

ii. Retrobulbar injection of 40 per cent. alcohol destroyed spargana in two cases in which it was used. The reaction was painless, the sterile debris were evacuated by incision where pointing, and cure followed, after a transitory paralysis of the muscles reached by the injection. *C. L.*

LAPAGE (G.). **The Cultivation of Infective Nematode Larvae on Cultures of** *Bacillus coli.*—*3rd Rep. Univ. of Cambridge. Inst. of Animal Path. 1932–33.* pp. 237–271. [39 refs.]

The importance of *Bact. coli* as the food of free living larvae of parasitic nematodes is confirmed, and the question of the carrying over of these and other bacteria into the host is considered.

It has been found that infective nematode larvae may be induced in a bile-serum medium to undergo development to the next ensheathing, and that if they then die the medium occasionally becomes septic from a growth of *Bact. coli* originating from the intestines of the larvae. It is on bacilli so procured that McCOY's conclusions (that these form the staple larval food) are confirmed. It has, then, been shown that some encysted infective larvae contain bacteria in the intestine, but by no means all. Since, when the second ecdysis takes place, the intestine normally contains bacilli the question is discussed whether all these are normally digested by the larva or whether they may be retained in its intestine. If so bacterial infection may in this manner be carried into the host when the worm larva enters it. It is felt that progress in selecting media may enable the whole life history of [parasitic] nematodes to be followed under controlled conditions thus leading to successful control and treatment of disease. *C. L.*

STEWART (James); SHEARER (George D.). **The Effects of Nematode Infestations on the Metabolism of the Host. Part I. Metabolism Experiments** [STEWART]. **Part II. The Isolation of a Substance capable of inhibiting Enzyme Action** [STEWART]. **Part III. The Effects of Nematode Infestations on Mineral Metabolism** [SHEARER & STEWART].—*3rd Rep. Univ. of Cambridge. Inst. of Animal Path. 1932–33.* pp. 58–76; 77–86; 87–129. [23 refs.]

These experiments on the metabolism of sheep should be kept in mind when considering the possible effects of parasitism by nematodes in man.

Heavy infections of nematodes lessened digestion of protein and apparently of crude fibre. From the nematodes themselves was

extracted a body which in *in vitro* experiments was shown to inhibit the action of pepsin. It is termed " nezyme " and to its action is attributed the poor condition and general emaciation of heavily infected animals. Nematode infections, too, interfere with calcium and phosphorus but not with sodium and potassium metabolism ; and by this means, it is concluded, may be explained the retardation of skeletal growth which occurs in young animals so infected. *C. L.*

BUCKLEY (J. J. C.). **" Some Observations on Two West Indian Parasites of Man."**—*Proc. Roy. Soc. Med.* 1933. Dec. Vol. 27. No. 2. pp. 134–135 (Sect. of Comp. Med. pp. 8–9).

The two parasites are *Syngamus nasicola* Linstow, 1899 of which *S. kingi* of Leiper 1913 is held to be a synonym ; and *Filaria ozzardi* which was nurtured to the stage of infective larva in *Culicoides* sp.

In the nasal cavities of sheep and cats in Trinidad syngamus was found. Those from the sheep were recovered also from cattle and goats and were identified as *S. nasicola.* " The morphological resemblance between this species and *S. kingi* is so well marked as to leave little doubt as to their indentity, and sheep, goats and cattle are thus incriminated as hosts of this potential human parasite." Attempts to transmit infection of the cat's Syngamus to other cats by feeding with infective larvae were entirely negative, and it is believed an intermediate host may be necessary in the life cycle.

In the case of *F. ozzardi* in a *Culicoides* sp., the " sausage " larvae lie in the thorax 3 days after an infective feed ; after 8 days, and apparently 2 months, the larvae, now 3 times their original length and 4 times their original breadth, lie in the head, and on decapitation of the insect and gently pressing on the head wriggle slowly out of the proboscis.

C. L.

LE ROY DES BARRES (A.). Dilatation énorme du cholédoque par ascaris. [**Great Dilatation of the Common Bile Duct by Ascaris.**]—*Bull. Acad. Méd.* 1934. Mar. 6. 98th Year. 3rd Ser. Vol. 111. No. 9. pp. 336–337.

The condition was discovered at laparotomy and two worms removed from the hugely dilated duct.

A woman of 36 had a 2 years' history of epigastric pain, vomiting, subicterus, and wasting. Ascaris eggs were present in the stool and 3 worms passed after santonin. After operation santonin removed 10 more. *C. L.*

HARROWER (Gordon). **Acute Haemorrhagic Pancreatitis due to** *Ascaris lumbricoides.*—*Malayan Med. Jl.* 1933. Dec. Vol. 8. No. 4. pp. 295–298.

The symptoms were those of acute abdomen with jaundice and death. There was at autopsy fat necrosis in the omentum, haemorrhage and necrosis throughout the pancreas, and an ascaris impacted in the common bile duct. *C. L.*

ASHFORD (Bailey K.), PAYNE (G. C.) & PAYNE (F.). **The Larval Phase of Uncinariasis.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1933. Dec. Vol. 9. No. 2. pp. 97–134. With 3 charts. [Spanish version pp. 135–153.]

A closer discussion, with protocols, of the remarkable epidemic of ancylostome infection acquired during sea bathing [*ante*, p. 122].

This paper, in addition to giving much detail, stresses the feature on which the authors base the inference contained in its title. There was a leucocytosis, highest in the first 3 months, and that leucocytosis was eosinophilic, in the case from which fewest worms were recovered (7 only) reaching 91 per cent.

"The continuance of a well-defined secondary anemia with few intestinal worms, and the history of a severe skin invasion with the marked changes in the leucocytes, heretofore noted, should make us think of the retention in the body tissues of the majority of the larvae whose complete cycle has been interrupted, especially when good food and the use of iron fail to cause a rise in blood values. . . . Thus, there seems to be a true larval phase of uncinariasis. It is indicated by loss of strength and weight, anemia, irregular fever, a definitely high eosinophilia and leucocytosis, possibly diarrhoea, and a light intestinal worm burden. Indeed, there may be no worms at all in the intestine, no ova from which to make a diagnosis, and only the blood and the history of the case to suggest a larval invasion and a frustrated uncinariasis."

As to treatment: "In this connection we must remember Maurice Hall's wise observation that the limitations of an anthelmintic can hardly be known save after a hundred thousand well-observed administrations."

It appears from the protocols [contrary to the conclusion drawn from reading the preliminary report] that in none of the 7 cases was deparasitization achieved even after 3 to 8 treatments with carbon tetrachloride and hexylresorcinol, the grave case (case 1) having still 2,600 ova per gram of faeces. An eighth case of chronic ankylostomiasis is cited by way of contrast.

"Blood sucking and hemorrhage from wounds caused by the worms in the intestine, while they nearly cost the life from hemorrhage of at least one of the seven preceding cases when these worms were immature and actively changing their feeding-ground in the intestine, in old chronic cases, where the worms are mature and lie with their heads quietly buried in the mucosa, they probably do not ordinarily cause enough hemorrhage to account for all of the anemia present."

The paper should be consulted for detail. *C. L.*

MATSUMOTO (K.). Ueber Wachstumsstörungen bei Infektion mit Ankylostoma duodenale. [**Disorders of Growth in** *A. duodenale* **Infection.**]—*Fukuoka-Ikwadaigaku-Zasshi* (*Fukuoka Acta Med.*). 1933. Oct. Vol. 26. No. 10. [In Japanese. German summary pp. 91–92.]

Matsumoto set himself to determine whether the short stature of Japanese is hereditary or acquired.

The paper is long with many tables, evidence of much work. The faulty German summary does not seem to do it justice and is difficult to understand. It is, however, clear that the height at 12 and 13 years averaged 123·8 cm. and 126·4 cm. in those infected with "Ankylostoma duodenale," and in those free from this infection [the diagnostic technique is unmentioned] 126·1 and 128·1 cm. respectively. In certain cases, too, a highly infected village held shorter children than did one with a lower infection rate. The matter is left there in the summary.

The bibliography does not contain the names of those who have worked particularly on the subject.

The appended extract* from the "Times" of January 23rd brings humour if not light to the subject. *C. L.*

ANDREOTTI (Aniello) & SCAMARCIO (F. Carito). L'anchilostomiasi alle porte di Napoli. [**Ankylostomiasis in Naples.**]—*Policlinico.* Sez. Prat. 1934. Jan. 15. Vol. 41. No. 2. pp. 54–56.

The authors have met with several patients in Naples—they give brief accounts of ten—with anaemia, dyspnoea, oedema, symptoms which led them to examine the faeces and hookworm ova were found.

They say that there are hundreds of families living in the plain between Naples and the slopes of Vesuvius under conditions favouring infestation. The soil is manured with human faeces, and heaps of manure are deposited near cisterns. Infestation may thus occur from the soil or the drinking water. The possibility of the larvae penetrating the roots of vegetables and so becoming infective for man is mentioned [but no warning is given against confusing larvae of hookworm with free-living nematodes which may occur at the roots of vegetables].

H. H. S.

WAKESHIMA (Tadasu). **Experimental Studies on the Tropisms of the Mature Larvae of Hookworms. IV. Report. Phototropism, Thermotropism, and Barytropism of the Mature Larvae of** *Ancylostoma caninum.*—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1933. Nov. Vol. 32. No. 11 (344). [In Japanese pp. 1533–1548. With 2 figs. [24 refs.] English summary pp. 152–153.]

The investigations already reported [*ante*, p. 127] are extended to the tropisms noted in the title.

Phototropism.—In a closed agar-containing tin larvae of *A. caninum* distributed themselves evenly. When such a tin had a 3 mm. wide hole bored on one side, larvae placed in the centre moved preponderatingly towards light, but if they had first been kept for 24 hours at 35°C. or for 2 hours at 40°C. they crept into the dark.

Barytropism.—Whether tested by a vertical agar plate or a vertical strip of blotting paper no influence of gravity could be determined.

Thermotropism.—Larvae moved in agar towards the warmer parts.

C. L.

EISMA (Molle). Die Differentialdiagnose des dritten Stadiums der Larven von Ancylostomidae bei Mensch, Hund und Katze. [**Differential Diagnosis of Third Stage of Larva of Ankylostomes of Man, Dog and Cat.**]—*Acta Leidensia* (*Scholae Med. Tropicae*). 1932. Vol. 7. 160 pp. With 99 figs. (29 on 8 plates). [64 refs.]

After describing the material and technique, there are minutely detailed the infective stages of *N. americanus*, *A. duodenale*, *A. caninum*, *A. braziliense* and *U. stenocephala*, their biometrical investigation and a key for differentiation of species. *C. L.*

*From *The Times* of Thursday, January 23, 1834. Price 7d. The *Court Gazette of Japan* promulgates the following curious imperial decree :—" All the young inhabitants are recommended to apply themselves to the art of growing tall. Those who shall attain 20 years of age without reaching their full stature shall receive the bastinado until they have a sufficient growth."—*French Paper.*

SCADUTO (Pasquale). Alcuni animali da cortile ed i passeri quali vettori della diffusione a distanza delle uova di ankylostoma. [**Sparrows and Farmyard Animals as Spreaders of Hookworm Eggs.**] —*Arch. Ital. Sci. Med. Colon.* 1933. Nov. 1. Vol. 14. No. 11. pp. 705–711. [14 refs.] English summary (4 lines).

The author administered orally to sparrows, chickens, ducks, turkeys and rabbits small quantities of human faeces containing ova of hookworm. In every case, after a few hours the eggs were passed and culture proved them to be viable. The author is of opinion that the risk of dissemination by these birds is not a small one. *H. H. S.*

MAPLESTONE (P. A.) & MUKERJI (A. K.). **Carbon Tetrachlorethylene in the Treatment of Hookworm Infection.**—*Indian Med. Gaz.* 1933. Nov. Vol. 68. No. 11. pp. 617–620. [12 refs.]

Carbon tetrachlorethylene [in combination] is at least as efficient against hookworms as is carbon tetrachloride and is safe, as experiments on cats show.

The study is that of 50 cases treated in hospital as follows: To two ounces of saturated solution of magnesium sulphate in a four-ounce flask were added 4 cc. of tetrachlorethylene and 1 cc. of oil of chenopodium. It is this mixture of drugs which was actually tested and not tetrachlorethylene alone. The mixture was shaken till the finest possible even emulsion was formed. "The dose is then given to the patient immediately, before the drugs have time to coalesce into larger drops and float to the surface, as they will do if the mixture is left standing. . . . We consider that the even diffusion of the drug throughout the draught gives it a much better chance of coming into contact with all the worms on the gut wall, and it is therefore more efficient than if given as an undivided globule of one drachm." Having already concluded that egg counts are not a dependable measure of anthelmintic efficiency (this *Bulletin*, Vol. 30, p. 205) the authors relied on a negative result to D.C.F., made at least 10 days after treatment. As so gauged the cure rate was 62 per cent. after one treatment and 74 per cent. after two; 60 per cent. suffered from toxic symptoms (giddiness 42, vomiting 18, nausea 8, drowsiness 2). The symptoms were never severe and the uneducated state of the patients necessitated answers being obtained by means of leading questions. It must also be noted that these symptoms may be compared to the effects of drunkenness. In view of the work of CHRISTENSEN and LYNCH [above] the condition of heart and lungs was watched in 10 cases; pulse and respiration rates were unchanged and the fall in blood pressure was slight and practically negligible. Maplestone and Mukerji note that in their previous investigation they obtained a cure rate of 20·7 per cent. [this *Bulletin*, Vol. 27, p. 419]. [Separating from this cited paper cases in which tetrachlorethylene was given alone from those in which it was combined with oil of chenopodium the cure rate in the latter was 26·2 per cent. (11 of 42) and in the former 8·3 per cent. (3 of 36).] *C. L.*

GARRISON (Harvey F.). **A Comparative Study of the Value of Tetrachlorethylene as a Means of Ultimate Control and Eradication of Hookworm Disease in Children.**—*Southern Med. Jl.* 1934. Jan. Vol. 27. No. 1. pp. 24–28.

Tetrachlorethylene, it is concluded, is the safest, the most economical, and the best treatment known for hookworm disease. The conclusion is evidently based on institutional treatment in bed.

The paper was read (in the Public Health Section of the Twenty-Seventh Annual Meeting of the Southern Medical Association) because of the apparent continued prevalence of hookworm disease in the Southern United States in spite of all that has been done to eradicate it. It records over 5,000 " routine stool examinations " (which perhaps means smears) in the Mississippi Baptist Hospital with 15 per cent. positives, 398 " stool examinations " in two Civilian Conservation Corps Camps in South Mississippi with 50 per cent. positives, and of examinations by " the brine floatation method " of over 600 children in institutions situated in the city of Jackson. The paper evidently deals in detail with these last, the institutions being sewer-connected and free from soil pollution. The treatment regime was strict.—At 4 p.m. magnesium sulphate. No supper. No breakfast next day, which was spent in bed. The drug at 6, 8 and 10 a.m. in doses of 1 cc., or 3 cc. in all to a child of over 10 (♏ iv. to 0·5 cc. to those under 10). Magnesium sulphate at noon. No food till it had acted. The course was repeated twice at weekly intervals so that in all 9 cc. were taken. Such triplicate courses were given regularly in April and in August to all whom the microscope showed to be infected just before the treatment session was begun. In this manner and dosage oil of chenopodium was given to 180 children [this is greater than the minimum lethal dose for an adult; its ascaridole content is unstated] and 39 per cent. remained infected. Similarly 229 children received carbon tetrachloride [in double the minimum lethal dose for an adult] and 45 per cent. remained infected. Finally 218 cases were treated with tetrachlorethylene, many being newcomers, others the uncured from other treatments, and only 7 per cent. remained infected. Since then over 300 cases had been treated with tetrachlorethylene, some series of them with 100 per cent. of cure, while a complete resurvey of the institutions last August showed only two infected and " they had received only one treatment."

In discussion H. C. Ricks reported several deaths in Mississippi from oil of chenopodium which had, however, been continued in the belief that the risk from hookworm was greater than that from the drug. The dose used for those of 15 and over was 2 cc. He thought it regrettable that the worm load had not been determined by Garrison before treatment. W. S. Leathers felt that an estimate of the residual worm burden based on the Stoll egg-counting method would have been interesting as an indication as to whether eggs " may have been reduced to the point where the number of hookworms harboured were of no pathological significance." He believed tetrachlorethylene would activate ascaris in the same way as did carbon tetrachloride, such infection constituting a contraindication. In reply Garrison remained unimpressed by the argument for egg counts. His aim was the complete eradication of hookworms, and nothing less. *C. L.*

Wakeshima (Tadasu), Yoshino (Kozen) & Narihara (Norio). **Application of Ascaridol in the Treatment of Ancylostomiasis, and Efficacy of the Anthelmintics in Relation to the Species of Hookworms and their Sex.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1933. Dec. Vol. 32. No. 12 (345). [In Japanese pp. 1751–1763. [22 refs.] English summary pp. 171–172.]

The anthelmintic effects of ascaridole, the active principle of oil of chenopodium, alone and with carbon tetrachloride, are reported in 36 cases.

The routine was, microscopic examination, treatment, search of the stools for 3 days, and re-examination by the microscope after an interval which is not stated. [The microscopical technique is unstated in the summary so that the reported results are of relative, not of absolute, value, particularly in view of the statement by H. H. HOWARD (this *Bulletin*, Vol. 14, p. 159) that "Even with an interval of 14 days between treatment and re-examination, there still exists a very material element of error in the negative findings" when the drug was oil of chenopodium.] Those who completed the course numbered 36 in 2 groups, 19 receiving 0·9 gm. of ascaridole, and after 30 minutes taking 40 cc. of castor oil (group A); and 17 receiving 0·6 gm. ascaridole and 1·6 cc. of carbon tetrachloride followed after 30 minutes by infusion "of 7 gm. of folia sennae with 28 gm. of magnesium sulf." (group B). Group A expelled an average of 12·79 worms with 18·18 per cent. of cures, and group B 15·06 worms with 60 per cent. of cures. Necators and males were expelled earlier than ancylostomes and females. Mild intoxications were shown by 63 per cent. in group A and 70 per cent. in group B. *C. L.*

KALANTARIAN (H.). Zur Trichostrongylosis in Armenien. [**Trichostrongylus Infestation in Armenia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1934. Jan. Vol. 38. No. 1. pp. 41–43.

Thymol produced in a man the following result :—*Taenia saginata* 1, ascarids 8, enterobius 217, trichostrongylus 4. The last were identified as *T. colubriformis* 1 male, *T. vitrinus* 1 male, 1 female, *T. skrjabini* 1 female. *C. L.*

CORDI (J. M.) & OTTO (G. F.). **The Effect of Various Temperatures on the Eggs and Larvae of Strongyloides.**—*Amer. Jl. Hyg.* 1934. Jan. Vol. 19. No. 1. pp. 103–114. With 1 graph. [14 refs.]

These experiments were carried out on *S. fulleborni* from the chimpanzee, *Anthropopithecus troglodytes*, in which the stage passed in the faeces is the egg and development is indirect, but it is felt that the species is so closely related to *S. stercoralis* that the authors' findings must be almost directly transferable to the latter species.

Nevertheless, in face of this difference the reviewer finds it difficult to isolate the facts likely to be important for human strongyloides infection, particularly in view of FAUST'S "hyperinfective strain" —the larvae which reach the filariform stage in the bowel. In this worm none do so, and the percentage which reaches this stage indirectly at 37°C. is very small. The authors, however, note that a "strain" which ordinarily hatches in the body may be better adapted for development at body temperature, especially if it reaches infectivity within the body. As regards *S. stercoralis* they note that stools swarming with larvae when passed were negative after 12–15 hours in the ice-box, and that it is customary to keep them so pending examination. They add that the poor power of adaptation of strongyloides eggs and larvae to temperature changes seems to account for their limitation to tropical and subtropical belts. *C. L.*

KILDUFFE (Robert A.). **The Bachman Intradermal Reaction in Human Trichinosis.**—*Amer. Jl. Med. Sci.* 1933. Dec. Vol. 186. No. 6. pp. 802–808.

The author prefers eosinophilia to intradermal reaction in the diagnosis of trichinosis.

As the result of applying both tests to 33 persons exposed to infection it is concluded that examination for eosinophilia is technically simpler and always feasible, while the antigen is difficult to prepare and not always available; in delicacy and constancy of appearance eosinophilia is a reliable index in man, so that the intradermal test has no practical advantages. The antigen used was supplied by SCHULTZ and obtained by passing isolated larvae many times through a Baermann apparatus, so that they were freed from foreign protein. The possibility of eosinophilia being due to quite other causes is not noted.

C. L.

AUGUSTINE (Donald L.). **Studies on the Subject of Prenatal Trichinosis.** —*Amer. Jl. Hyg.* 1934. Jan. Vol. 19. No. 1. pp. 115–122.

" Observations on rabbits, rats, swine and a child born of trichinous mothers confirm the conclusion of Stäubli (1909) that prenatal infection does not occur in trichinosis."

Observation on the mother and child were as follows :—

" A twenty-five year old primipara, contracted trichinosis approximately three weeks before parturition took place. The blood expelled with the placenta and all collected in the third stage was saved and examined for parasites. None was found. The placenta was carefully studied and there was no evidence of parasitic invasion in the numerous sections taken. On the fifth day after the birth of the child, the mother's eosinophile count was 24 per cent., and that of the child was 3·5 per cent. Skin tests were performed six months later by Dr. Friedlander. Positive reactions were obtained with the mother, but the test with the child was negative.

" The absence of eosinophilia in the child, the negative skin test and the negative findings in the placental blood and tissues were accepted as indicating that the infection had not entered the fetus." *C. L.*

PALLISTER (R. A.). **Trichuriasis in Malaya.**—*Malayan Med. Jl.* 1933. Dec. Vol. 8. No. 4. pp. 303–305.

Two unusual cases are reported whose symptoms are attributed to heavy trichuris infection.

1. A boy of 3 with dysenteric symptoms, 40 per cent. haemoglobin, ova of hookworms and trichuris in the faeces, and trichuris visible and picked off through the sigmoidoscope, was, after trials with other drugs, given an enema of 2 drachms of carbon tetrachloride and half a drachm of oil of chenopodium of unstated ascaridole content emulsified in 8 ounces of water. This treatment was repeated twice. The total bag was :—maggots 60, ascaris 1, hookworms 15, whipworms 884.

2. Autopsy on a Tamil woman (who had suffered from fever, cough, watery stools without blood or mucus, haemoglobin 45 per cent., much emaciation) showed a moderate infection with hookworms and roundworms in the small bowel, and in the large bowel masses of whipworms which must have numbered many thousands. The largest mass was in the descending colon where there was superficial ulceration. *C. L.*

HELLSTEN (H.). Till fraagan om oxyuris' paavisande, förekomst och betydelse. [**The Demonstration, Incidence and Significance of Oxyuris.**]—*Nord. Med. Tidskr.* 1933. Vol. 6. pp. 1358–1363. [33 refs.]

This study, conducted in Lund, Sweden, deals with 410 persons in whom a search for threadworms in the rectum was made by means of a

palpating finger on which a vaseline-impregnated rag was carried. The material thus obtained was shaken up in water and ether and then centrifuged. The search for eggs yielded positive results, the frequency of which increased with the age of the persons examined. Thus, among 60 infants there was not one positive result, whereas among 240 children in hospital between the ages of 1 and 15 there were 99 harbouring oxyuris eggs (41·25 per cent.). Between the ages of 10 and 15 (80 children examined) the infestation-rate was as high as 58·75 per cent. Positive results were obtained in 27 out of 40 school children between the ages of 8 and 13, and in 42 out of 60 inmates of an asylum.

Discussing the value of this rectal test for thread-worms, Hellsten notes that it is not absolutely reliable, for in a couple of cases in which oxyuris eggs could not be found in the rectum after repeated examinations, threadworms were found in the appendix in the course of an appendicectomy. On the other hand, a higher percentage of positive findings has resulted from rectal than from post-mortem examinations. As for the ability of threadworms to cause disease and the need for conducting a campaign against them, opinions continue to vary. Some hold that threadworms play an important part in the genesis of appendicitis, whereas BECKER has found them in 10·8 per cent. of acutely inflamed appendices, in 23 per cent. of those in which the inflammation had subsided, and in 54·2 per cent. of the appendices in which there was no sign of inflammation. It is, however, conceivable that threadworms may give rise to symptoms simulating those of appendicitis. *C. Lillingston.*

GOODALE (Raymond H.). **Enterobius Vermicularis of the Appendix.** —*New England Jl. of Med.* 1934. Feb. 15. Vol. 210. No. 7. pp. 372–374. [14 refs.]

The Pathologist at the Worcester City Hospital, Mass., U.S.A., reports as follows on appendices removed by operation :—

"In a series of 1,639 consecutive appendices, 101 (6·1 per cent.) had oxyuris vermicularis in varying numbers in the lumen. The female patients are infected more than three times as often as male patients. The highest incidence of infection occurs during the first two decades. The seasonal incidence suggests infection during the school year." *C. L.*

VINKS (W. A.) & MCARTHUR (A. W.). **Santonin Poisoning.**—*California & Western Med.* 1933. Dec. Vol. 39. No. 6. pp. 409–410.

Supported by two cases of poisoning in children by doses less than those advised in proprietary preparations, it is urged that santonin should not be given without prescription, that even so the child's physical condition, and not merely age, should be taken into account, and that the drug should not be given fasting.

In both cases "worm candies" were given by the mother for thread worms, dosages being 1 grain to a rather undernourished girl of 7 (printed directions allowing 2¼ grains), and 1½ grains to a slightly underweight boy (2½ grains "allowed"). In both cases therapeutic starvation was markedly enforced. The toxic effects were stupor, jaundice, enlarged liver and in one case spleen, haematuria, to van den Bergh's test 0·8 and 1·5 mgm. of bilirubin per 100 cc. of blood. In both cases jaundice persisted for a week and grave symptoms for 2 and 3 days less. Red corpuscles were still present in the urine after 10 days in one

patient, and in the other, who had had marked right sided abdominal tenderness and resistance, persisted to some extent for a fortnight.

C. L.

BACKHOUSE (T. C.). *Anopheles punctulatus* **as an Experimental Intermediate Host of** *Wuchereria bancrofti*. **Some Preliminary Observations.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 365–370.

In both *A. punctulatus* itself and its variety *molucensis* larvae of *W. bancrofti* developed to morphological maturity.

Morphologically the microfilariae were *Mf. bancrofti*, not *Mf. malayi*. The feeder showed great variation in the numbers of microfilariae in a unit of blood between 9 and 10 p.m. Of 43 *A. p. molucensis* which fed, 20 survived for 14 days or more, 14 of these (70 per cent.) showed morphologically mature infective-stage larvae, and in 10 they were present in the labium. As HEYDON (this *Bulletin*, Vol. 29, p. 475) pointed out, the infective larva is active inside the mosquito's body and Backhouse saw one twice enter the labium and withdraw to the head where it was found on subsequent dissection. *A. punctulatus* seems less tolerant of captivity than the variety, for of about 50, only 11 could be induced to bite, only 4 survived 16 days or more, and 3 of these showed anatomically mature larvae. *C. L.*

KORKE (Vishnu T.). **Observations on Filariasis in Some Areas in India. Part X. Gwalior State Area.**—*Indian Jl. Med. Res.* 1934. Jan. Vol. 21. No. 3. pp. 569–580. With 4 graphs & 1 map.

This tenth report on the author's investigations covers examination of 1,041 stained thick films of night blood. The points of general interest are indicated in this quotation :—

" A marked contrast exists between the physical, climatic and crop conditions of the infected area of Gwalior State and the Gangetic Belt of Bihar and Orissa, although the incidence of infection in these two areas is almost the same.

" The endemic area of the Gwalior State is at an elevation of 500 to 1,000 feet above sea-level the country being dry and arid, while the Gangetic Belt at a lower elevation (200 to 400 feet) is damp and moist. The area in Gwalior State is subject to extremes of temperature, while the Gangetic Belt of Bihar and Orissa showing an equal filarial incidence is more moderate in climate and more humid. The former area is a land of dry cultivation, while in Bihar and Orissa rice is extensively cultivated under water. These differences in physical, climatic and crop conditions are striking and would serve to correct an impression, which has been conveyed by previous surveys, that an association of filarial infection with moist humid climate and low-lying rice growing areas is an essential one.

" The contrast between the incidence of filariasis in the plains area of Gwalior State and in the Malwa plateau is definite, and the absence of infection in the latter area would indicate that an investigation of the epidemiological factors in the two areas might afford an opportunity of determining the influence which various factors may have on the spread of infection." *C. L.*

GOLDEN (R.) & O'CONNOR (F. W.). **The Roentgen Treatment of Filariasis. I.—Chyluria. II.—Filarial Lymphangitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1934. Jan. 31. Vol. 27. No. 4. pp. 385–398. [21 refs.]

The authors' opinion, expressed with restraint, is that benefit has followed Roentgen ray treatment in both conditions.

Chyluria.—After a short historical survey the technique is described, for which the original should be consulted. Seven cases were treated and details tabulated. The rays were applied in the kidney region. It is pointed out that owing to the short series and the short observation periods (3 months to 3 years) conclusions are tentative ; nevertheless in all of them chyluria ceased for at least a time coincidently with treatment. This was initiated because of the well-known sensitiveness of lymphatic structures to X-rays.

Lymphangitis and Adenitis.—Fifteen cases are detailed in a table. At first merely focal spots were irradiated, but later the entire leg ; and the impression was gained that larger doses and more prolonged treatment (as detailed) gave better results. As to these : 4 had no further attacks, one had a mild one and then nothing more (1½ years), one had occasional but milder attacks, in one a mild abortive attack occurred 2½ years after treatment, in one return to the tropics induced recurrence but another series of treatments was followed by freedom to date (9 months). In two, attacks were as before radiation. In five, including one loa case, judgment was difficult. One case is probably a record in the number of *W. bancrofti* recovered, namely 80 from 3 sets of groin glands. There are seemingly more worms in him since local symptoms have reappeared in the right iliac region.

Investigations continue in New York, but it is urged that they should be undertaken where the infection is indigenous. *C. L.*

GIBBINS (E. G.) & LOEWENTHAL (L. J. A.). **Cutaneous Onchocerciasis in a *Simulium damnosum*-infested Region of Uganda.**—*Ann. Trop. Med. & Parasit.* 1933. Dec. 20. Vol. 27. No. 4. pp. 489–496. With 1 map. [25 refs.]

Cutaneous onchocerciasis is discussed from clinical and entomological standpoints.

The history of the association between skin lesions and onchocerciasis is discussed, and authorities quoted for such association in West, Central and East Africa. The district now considered lies on either side of the Nile as it leaves Victoria Nyanza. The distribution of cases treated at Mulago Hospital, Kampala, almost coincided with that of Simulium. Accordingly investigations on the spot were undertaken. At Buwenda, where the Nile issues from the lake, practically all inhabitants suffered from lichenification, biopsy showed that 9 of 13 were infected, and 7 of 48 *S. damnosum* dissected showed embryos. Elsewhere none were found in the fly outside the gut. The skin lesions were of all kinds, papular and papulo-pustular to generalized lichenification, subcutaneous nodules were found in about a third of those having lichenification, and their dissection revealed adult worms. Cases were found, indistinguishable from cutaneous onchocerciasis, which had apparently followed other itching dermatoses such as scabies, and " it is just possible that the skin changes in onchocerciasis are due to long-standing attacks by the Simulium, whose bite can irritate for a period

of a week " ; indeed there may be intense infection of the skin by larvae but no lichenification. Only regions inhabited by *S. damnosum* and *S. adersi* were investigated, but *S. neavei* occurs in others, and further investigation will probably implicate other species. Since as many as 14 per cent. of flies have been found infected, and since huge tracts of extremely fertile country are uninhabited through their ravages, while the lives of those living there are rendered most miserable by irritation from their bites, the question of their suppression is urgent. It is futile to attempt this by attacks on their breeding grounds ; perhaps trapping may prove feasible. *C. L.*

RIOU (M.). Localisation anormale d'un ver de Guinée avec présence de nombreux embryons dans le pus. [**Unusual Site of a Guineaworm.**] —*Bull. Soc. Path. Exot.* 1934. Jan. 10. Vol. 27. No. 1. pp. 86–87.

At Dakar the opening of a groin abscess showed this to be sterile but to contain numbers of guinea-worm larvae. The mother worm was then extracted by progressive windings, and measured 80 cm. long.

C. L.

BRUNELLI (Piero). Emetina e tartaro stibiato nella cura della bilharziosi vescicale.—*Arch. Ital. Sci. Med. Colon.* 1934. Mar. 1. Vol. 15. No. 3. pp. 180–185. With 1 fig. English summary (3 lines).

FOSBERY (F. W. A.). Schistosomiasis in China.—*Jl. Roy. Nav. Med. Serv.* 1934. Jan. Vol. 20. No. 1. pp. 68–70.

GRAHAM-YOOLL (M. A.). Notes on *Schistosomiasis japonica.—Jl. Roy. Nav. Med. Serv.* 1934. Jan. Vol. 20. No. 1. pp. 63–68. With 1 fig.

GRISOLIA Y JURISTO (Manuel). Parasitismo intestinal en 200 habitantes de un distrito de Granada.—*Medicina Países Cálidos.* Madrid. 1933. Nov. Vol. 6. No. 6. pp. 455–487. [52 refs.]

HECKENROTH & GUILLINY. Sur un cas d'infestation double par *Fasciola hepatica* et *Schistosomum mansoni* chez un Somali.—*Marseille-Méd.* 1932. June 25. Vol. 69. No. 18. pp. 817–821.

MEZQUITA LOPEZ (Manuel) & GARCIA CORSELAS (Tomas). Parasitismo intestinal en el niño escolar.—*Rev. San. e Hig. Pública.* 1934. Jan. Vol. 9. No. 1. pp. 16–28. With 5 graphs. [41 refs.]

PALLARY (Paul). Sur la répartition des bullins et du planorbe de la Mitidja en Algérie.—*Arch. Inst. Pasteur d'Algérie.* 1933. Sept. Vol. 11. No. 3. pp. 455–463.

PÓVOA (Hélion). Pathogenia da anemia ancylostomotica. Conceito moderno.—*Folha Med.* 1934. Mar. 5. Vol. 15. No. 7. pp. 73–76.

SAVIGNONI (Ferdinando) & DE MARIA (Giorgio). Azione di alcuni antielmintici sulla madre e sul prodotto del concepimento. (I danni provocati sperimentalmente negli animali gravidi colla somministrazione di dosi terapeutiche di tetracloruro di carbonio, cloroformio, estratto etereo di Felce maschio e timolo.)—*Sperimentale.* 1933. Vol. 87. No. 5–6. pp. 557–584. With 16 figs. [35 refs.] English summary (6 lines).

TANTURI (Carlos Alberto). Los eosinófilos de la hidatidosis.—*Semana Méd.* 1933. Nov. 16, 23 & 30. Vol. 30. Nos. 46, 47 & 48 (2079, 2080, 2081). pp. 1493–1536 ; 1650–1655 ; 1698–1709. With 24 figs. [3 pages of refs.]

TROPICAL OPHTHALMOLOGY.

A Review of Recent Articles. XXI.*

Trachoma.—Julianelle & Harrison[1] have conducted some experiments by which they claim to prove that an infection specific to trachoma can be conveyed from human patients to the eyes of monkeys (*M. rhesus*). Thygeson[2] has reported the result of some researches he has made in Tunis. Studying the question of the influence of the Prowazek-Halberstaedter inclusion body in twenty-three cases of uncomplicated trachoma, he was unable to come to any definite conclusion ; but he remarks that the presence of cell inclusions is a common characteristic of many virus diseases though it is not constant ; and the fact that trachoma shares this characteristic rather suggests that it belongs to the same class of disease. He isolated a variety of micro-organisms (none capable of reproducing the disease in man) from patients suffering from trachoma ; but failed to find the *Bact. granulosis* of Noguchi though a saprophyte which closely resembled it was met with in 46 per cent. of the cases. Serum reaction experiments proved negative. In two patients who suffered from trachoma which affected one of their eyes only, Lumbroso[3] succeeded in infecting the healthy eye by inoculating it from the diseased one. One of these patients had suffered from the disease for two years without any involvement of his healthy eye. These two writers[4] report six inoculation experiments on the human subject with filtered trachomatous material. All proved negative. Nicolle & Lumbroso[5] have now found that patients cured of trachoma can be reinfected by inoculation from a fresh case. Cornet[6] advocates alcohol injections into the retrotarsal fold in addition to the use of roller forceps and the application of copper. Under local anaesthesia the entire membrane, including the plica and caruncle, is first curetted. The upper cul-de-sac is then crushed between the blades of a roller forceps and a saturated solution of copper applied on a mop. Up to one cc. of alcohol and novocaine (alcohol à 45° -novocaïne) free from adrenalin is next injected into the retrotarsal fold. The sac is irrigated with distilled water and an ointment of camphor and copper applied.

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* For the twentieth of this series see Vol. 31, pp. 14–18.

[1] Julianelle (L. A.) & Harrison (R. W.). Transmissibility of Trachoma to Monkeys.—*Amer. Jl. Ophthalm.* 1933. Oct. Vol. 16. No. 10. pp. 857–862. With 2 figs. [11 refs.]

[2] Thygeson (Phillips). Recherches expérimentales sur le trachome.—*Arch. Inst. Pasteur de Tunis.* 1933. Aug. Vol. 22. No. 2. pp. 157–177. With 1 coloured plate & 1 fig. [11 refs.]

[3] Lumbroso (Ugo). Recherches expérimentales sur le trachome unilatéral.—*Arch. Inst. Pasteur de Tunis.* 1933. Aug. Vol. 22. No. 2. pp. 184–186.

[4] Lumbroso (Ugo) & Thygeson (Ph.). Etude de la filtrabilité du virus trachomateux.—*Arch. Inst. Pasteur de Tunis.* 1933. Aug. Vol. 22. No. 2. pp. 178–183. [10 refs.]

[5] Nicolle (Charles) & Lumbroso (Ugo). Nouvelles expériences de réinoculation du virus du trachome à des sujets guéris d'une atteinte naturelle.—*Arch. Inst. Pasteur de Tunis.* 1933. Aug. Vol. 22. No. 2. pp. 187–192.

[6] Cornet (Emmanuel). Du traitement cupro-alcoolo-mécanique du trachome.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 474–477.

In the *Revue Internationale du Trachome* for October 1933 Donato CATTANEO[7] cites experiments he has made which he thinks suggest that the conjunctival membrane of some persons exhibits a peculiar susceptibility to the disease. He succeeded in causing a new attack in a cured trachomatous subject and in converting a mild attack into a severe one by inoculating the patients with fresh trachomatous matter. V. MORAX[8] reviews the discussion held at the Madrid International Congress on the effect of constitutional and nutritional factors upon the disease. He disagrees with PITTALUGA's view that trachoma develops in the lymphatic type of subject whose resistance to every kind of microbic infection has been lowered by malnutrition. ROSTKOWSKI[9] attempts to differentiate the varieties of granulation found in the conjunctiva. Some people have an excessive development of adenoid tissue throughout their system ; and follicles in their conjunctival membrane are in no way pathological. This type, however, is particularly susceptible to infections and is liable to contract a follicular conjunctivitis in circumstances in which a more normal person would suffer from a simple conjunctivitis or would remain free from trouble. A follicular inflammation which develops in a membrane previously smooth is likely to be trachomatous, but only long experience enables one to make a sure diagnosis. The author's instrument for securing a double eversion of the upper lid with a full exposure of the retrotarsal fold is a valuable aid. [Thorough exposure of the fold can be secured and inspection facilitated, if the lid is everted and the membrane " ballooned " by injecting a syringeful of fluid at the upper edge of the tarsal plate. This procedure, too, shows up any fine strands of fibrous tissue which may be present.] J. SÉDAN[10] notes how very rarely pterygium and trachoma are found together in the same patient. He suggests that there may be marked differences in the membranes of individuals which favour the development of pterygium in one person and of trachoma in another.

In the issue for January 1934 A. F. MACCALLAN[11] reviews the clinical signs of trachoma. He commences by remarking that the diagnosis may be only a simple matter in well-marked cases, but in others it may be impossible to come to a definite decision. This warning, coming from an authority of such experience, is impressive. He considers the presence of grey follicles on the conjunctiva of the upper tarsus accompanied by new-formed vascularization of the cornea to be a pathognomonic sign of trachoma. Thirty per cent. of trachomatous Egyptians develop entropion and trichiasis in later life. TALBOT[12] discusses the seasonal epidemics of gonorrhoeal ophthalmia which occur in Southern Tunis. These commence in September and last

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[7] CATTANEO (Donato). La " iperrecettività " nel tracoma.—*Rev. Internat. du Trachome.* 1933. Oct. Vol. 10. No. 4. pp. 180–190. [16 refs.]

[8] MORAX (V.). Le trachome au congrès international de Madrid. Constitution, alimentation et trachome.—*Rev. Internat. du Trachome.* 1933. Oct. Vol. 10. No. 4. pp. 190–193.

[9] ROSTKOWSKI (Louis). Appréciation clinique des granulations de la conjonctive.—*Rev. Internat. du Trachome.* 1933. Oct. Vol. 10. No. 4. pp. 194–202. With 9 figs. [23 refs.]

[10] SÉDAN (Jean). Ptérygion et trachome.—*Rev. Internat. du Trachome.* 1933. Oct. Vol. 10. No. 4. pp. 207–209.

[11] MACCALLAN. The Clinical Signs of Trachoma.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 3–10. [13 refs.]

[12] TALBOT. Trachome et cécité dans le sud tunisien.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 14–19.

till the end of December and cause much blindness. Both trachoma and gonorrhoeal ophthalmia specially afflict children and gonococcal ophthalmia is the more common. Some ophthalmologists in Tunis, however, regard the staphylomatous leukomata, which are so often the consequence of purulent ophthalmia, as being due to trachoma. SCHOUSBOË[13] recounts the result of his investigations amongst Algerian children, and confirms the findings of other observers. Trachoma infection takes place during the early months of life from the mother and other members of the family, and the incidence of the disease bears a direct proportion to the poverty of the family. Fresh infections from playmates in the streets aggravate the disease, and attention must be paid to these points when measures of prophylaxis are under consideration. TRAPESONTZEWA & NIKOLSKAJA[14] report a study they have made regarding the bactericidal action of chaulmoogra oil. They found that whilst it was quite inert as regards organisms of the typhoid and staphylococcus groups, it had a definitive selective action against the bacilli of Koch, Hansen and Löffler, and suggest that a combination of the oil with copper might prove very useful in the treatment of trachoma. With reference to SÉDAN's suggestion that an antagonism may exist between pterygium and trachoma, MACCALLAN[15] remarks that this is contrary to his experience in Egypt and BARGY[16] makes the same remark regarding Indo-China.

Hyaline Degeneration of the Conjunctiva.—DODERO & CORNET[17] describe eighteen cases of degeneration of the periocular tissues seen in Indo-China. The palpebral conjunctiva, the tarsal plates, the fornix and the semilunar fold were the common sites of the affection, and the disease might be present in one or more at the same time. All showed an irregular thickening of the conjunctiva and a hyperplasia of the lymphoid tissue which might be either diffuse or follicular. Fibrous bands traversed the corium amongst which were islands of hyaline and amyloid matter, some of these being calcified or ossified. The disease causes considerable disability. The authors consider that trachoma plays an important part in the aetiology though other factors cannot be excluded.

Cataract.—BEDELL[18] advocates full dilatation of the pupil when making a study of the lens. He considers that the most simple and comprehensive scheme for the classification of cataract should regard the embryonic, foetal, infantile and adult nuclei, the cortex and the capsule as integral but separable parts of the lens. He does not believe that diabetes causes any distinctive type of cataract even though it

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[13] SCHOUSBOË. Notions d'épidémiologie du trachome infantile tirées de l'étude de graphiques.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 19–29. With 4 graphs.

[14] TRAPESONTZEWA (C.) & NIKOLSKAJA (Z.). Des propriétés bactéricides de l'huile de chaulmoogra.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 29–38.

[15] MACCALLAN. Pterygium and Trachoma.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 38–39.

[16] BARGY (M.). Pterygion et trachome.—*Rev. Internat. du Trachome.* 1934. Jan. Vol. 11. No. 1. pp. 39–41.

[17] DODERO & CORNET. Sur 18 cas de dégénérescence périoculaire observés en Indochine.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 456–468. With 5 figs. on 1 plate. [34 refs.]

[18] BEDELL (Arthur J.). Some Remarks on the Etiology of Cataracts. Slitlamp Studies.—*Amer. Jl. Ophthalm.* 1933. Nov. Vol. 16. No. 11. pp. 945–950.

may be the aetiological factor in the ocular disease. The type which is characterized by widespread water clefts is probably the one which develops most rapidly. He has never found any form of cataract to be influenced by medical treatment.

ELLIOT[19] has in two lectures dealt with cataract from the viewpoint of the general practitioner. Though primarily intended for practitioners in Europe most of the points are applicable to tropical conditions. The lectures do not deal in any way with operative technique, but are full of common-sense advice regarding conditions which concern the cataractous patient and his medical adviser. With respect to treatment which is intended to retard the development of a senile cataract, he remarks that the disease depends upon a perversion of nutrition associated with the advance of life, and has little confidence in anything but the administration of a suitable glandular extract. He earnestly protests against the antiquated custom of allowing a patient to become completely blind before undertaking an operation; and he also gives good reasons for advising the removal of a ripe cataract even though the patient's other eye has good vision.

WRIGHT[20] has made a valuable contribution to the literature of cataract extraction. He believes that there is in fact no such thing as senile cataract due to senility pure and simple; but there is a form of cataract of unknown origin which occurs in the aged. Various endotoxic conditions may be concerned in this disease; and hookworm infection may be a factor in some countries. He relies chiefly on the use of a trial bandage and on the employment of Herbert's method of perchloride of mercury irrigation to prevent sepsis; and he favours akinesis by injection of the temporo-facial division of the seventh nerve as it lies superficial to the neck of the mandible (O'Brien's method) and ciliary block. The author rightly protests against the old-fashioned custom of keeping the patient lying supine and still for long periods after the operation. He practises both intracapsular and extracapsular extraction, choosing the particular type of operation to suit the individual. He considers that a forceps extraction method is likely to prove the most successful form of intracapsular extraction technique in the hands of the majority of operators.

CHATTERJI[21] has briefly reviewed the history of cataract surgery. He provides an interesting account of SUSRUT's description of couching in the Susruta Sanhita, written about 1000 B.C. It is not quite clear whether this authority practised declination or reclination of the cataractous lens; but the cataract seems to have been approached from the anterior chamber, and it is stated that "if the puncturing (of the tunic) is properly done there will be an escape of fluid with a sound but improperly performed operations will cause bleeding and there will be no sound." The author has a predilection for the Smith operation and gives Smith full credit for developing his most valuable technique of orbicularis control.

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[19] ELLIOT (R. H.). Cataract Extraction from the Point of View of the General Practitioner.—*Post-Graduate Jl.* 1933. Sept. Vol. 9. No. 95. pp. 325–335.

[20] WRIGHT (Robert E.). The Operative Treatment of Cataract.—*Irish Jl. Med. Sci.* 1933. Oct. & Nov. 6th Ser. Nos. 94 & 95. pp. 549–566; 599–610.

[21] CHATTERJI (Niranjan). History of Development of Cataract Surgery and its Latest Improvement.—*Jl. Indian Med. Assoc.* 1933. Aug. Vol. 2. No. 12. pp. 490–492.

Glaucoma.—HERBERT[22] has made a further note on the value of causing a small irido-dialysis when performing an iridencleisis operation for the relief of chronic glaucoma. He considers that such a measure, by inducing rapid and complete degenerative changes in the prolapsed iris, favours the development of a protective barrier of fibrous tissue in the neighbourhood of the prolapse. The fibrous elements are derived from the conjunctiva and do not interfere with filtration since they do not unite with the underlying sclerotic.

Retrobulbar Neuritis.—RAY[23] recommends the use of "Contramine" injections for the relief of such cases of retrobulbar neuritis as are not due to disseminated sclerosis, diabetes and syphilis (unless the Wassermann reaction is negative after anti-syphilitic treatment). Tobacco and quinine amblyopias, too, fail to respond to the treatment. "Contramine" is an organic sulphur compound, and a course of six deep intramuscular injections is given. The dose varies from 0·25 to 0·5 gm. according to the age of the patient and an interval of twenty-four hours is left between each injection. The drug may prove dangerous to patients who are suffering from diabetes, nephritis, or arteriosclerosis.

Oxycephaly.—SAWHNEY[24] reports the case of two Punjaubi brothers who both suffered from oxycephaly accompanied by complete bilateral ophthalmoplegia. The boys were aged five and eleven respectively. The condition was congenital and there were four other children in the same family who were quite healthy.

Quinine Amblyopia.—BARLING[25] has recorded an instance of quinine poisoning which occurred in London. The ocular changes were those ordinarily associated with the condition. On recovering consciousness the patient, a woman aged 44, found that she was completely blind. Her pupils were wide and inactive, the retinal arteries contracted and irregularly constricted at intervals, both discs dead white with sharply defined margins and patent lamina cribrosa. Some sight was regained after nine days and six weeks after the commencement of symptoms central vision in each eye had recovered to 6/12, but the fields of vision remained much contracted. She had taken as an abortifacient half an ounce of quinine sulphate. The whole quantity was consumed within twenty minutes, and unconsciousness set in about five minutes after taking the last dose.

Glare.—RUGG-GUNN[26] has contributed a comprehensive study of the comparative value of different varieties of glass in affording protection against rays likely to prove injurious to the eye. Tropical glare is the resultant of long-wave radiation from heated rocks and sand, diffuse luminous reflection and diffuse ultra-violet reflection. Tropical sunlight is characterized by a high ultra-violet intensity which is

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[22] HERBERT (H.). Supplementary Note on Iris Inclusion for Chronic Glaucoma.—*Brit. Jl. Ophthalm.* 1934. Mar. Vol. 18. No. 3. pp. 142–148.

[23] RAY (N. N.). Chronic Retrobulbar Neuritis and Amblyopias of Toxic Origin. A New Method of Treatment.—*Brit. Jl. Ophthalm.* 1934. Mar. Vol. 18. No. 3. pp. 170–172.

[24] SAWHNEY (M. R.). Oxycephaly in Brothers.—*Brit. Jl. Ophthalm.* 1934. Mar. Vol. 18. No. 3. pp. 169–170. With 1 fig.

[25] BARLING (B.). Quinine Amblyopia.—*London County Council Ann. Rep. 1932.* Vol. 4. Pt. 3 (Med. Supp.). pp. 137–139. With 1 fig.

[26] RUGG-GUNN (A.). Data concerning Radiation and Protective Glasses with a Note on Retinoscopes.—*Brit. Jl. Ophthalm.* 1934. Feb. Vol. 18. No. 2. pp. 65–98. With 13 figs. [70 refs.]

constant throughout the year. True ultra-violet conjunctivitis, apart from that experienced on snow-covered mountain ranges, is rather infrequent. Photo-sensitization occurs in "snow-blindness," and one attack of such conjunctivitis predisposes to others. Crookes's glass in every form is extremely opaque to ultra-violet rays; whilst reflecting glass, made by causing a deposit of a metal on the surface, is efficient in reflecting infra-red rays. Gold obstructs 99 per cent. of the infra-red radiation from a furnace heated to 1,050°C. PFUND produced twenty-five years ago a gold-plated glass in order to protect welders against infra-red radiation, and more recently IMRE has used platinum and silver as well as gold. The metallic film is deposited on the surface of one glass and is protected by another superimposed upon it; this type of reflecting glass is termed "laminated." The author concludes that Crookes' A.2, B.1 and B.2 should give efficient protection to those who exhibit glare intolerance, but contributing factors such as health disturbances and errors of refraction must of course be attended to in addition. A Crookes' B.1 or B.2 glass with a thin metallic film adherent to its outer surface should prove ideal for aviators in the tropics, and an aluminium deposit is likely to be more permanent than the other metals. A laminated glass is advisable for use on snow-fields and the combination suggested is a Crookes' B.2 with a gold film deposit and a cover-glass of uranium glass.

Anti-rabic Inoculation.—CORMACK & ANDERSON[27] report a case of double papillitis in which symptoms appeared twenty-four days after the patient had been bitten in the arm by a rabid dog. Antirabic treatment commenced two days after the receipt of the bite and ended nine days before the eye symptoms appeared. About two dioptres of swelling was evident, but no haemorrhages or exudates were present. The left eye was completely blind and vision in the right was reduced to 6/36. Recovery began after about two weeks treatment, and, except for a small scotoma in the left field, became complete after an interval of two months.

Sparganosis.—JOYEUX, HOUDEMER & BAER[28] have studied two varieties of Dibothriocephalidae responsible for ocular sparganosis in Indo-China: viz. *D. mansoni* and *D. erinacei europaei*. They report that the former principally affects warm blooded vertebrates whilst the latter has an affinity for the frog tribe. Either can penetrate the conjunctiva readily and cause ocular sparganosis. The prevalence of the disease in the Far East is due to the native custom of using disembowelled frogs as a local application in the case of eye affections. HOUDEMER, DODERO & CORNET[29] have made an important contribution to the literature of ocular sparganosis in which they discuss the history, symptoms and treatment of the disease. Domestic animals such as dogs and cats harbour the adult worm and frogs, snakes and birds carry on the cycle. Unfortunately the local application of an eviscerated or a flayed frog enjoys an undeserved reputation amongst

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[27] CORMACK (H. S.) & ANDERSON (L. A. P.). Bilateral Papillitis following Antirabic Inoculation: Recovery.—*Brit. Jl. Ophthalm.* 1934. Mar. Vol. 18. No. 3. pp. 167–168.

[28] JOYEUX (C.), HOUDEMER (E.) & BAER (J.). Recherches sur la biologie des *Sparganum* et l'étiologie de la sparganose oculaire.—*Bull. Soc. Path. Exot.* 1934. Jan. 10. Vol. 27. No. 1. pp. 70–78. With 1 fig.

[29] HOUDEMER, DODERO & CORNET. Les sparganoses animales et la sparganose oculaire en Indochine.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 425–451. With 4 figs. [25 refs.]

the Annamites as a cure for diseases of the eye, and infection of the periocular tissues is likely to occur in consequence. Lodgement in the lid causes an irregular, painless swelling which is accompanied by some oedema. Subconjunctival infection leads to considerable chemosis and the formation of a small nodule. Proptosis occurs when the infection is retrobulbar ; this may be sufficient to lead to lagophthalmos and corneal ulceration ; a painless oedema of the lids is also likely to be present. The treatment lies in extirpation, but this may prove difficult when the number of the parasites is great. Ignipuncture may cause a worm which lies in an inaccessible position to move to a place more favourable for its removal. CORNET[30] found that the retrobulbar infections could be successfully treated by injecting behind the globe from 2 cc. to 4 cc. of 40 per cent. alcohol with novocaine free from adrenalin. The injection may cause a temporary paralysis of an ocular muscle, but recovery takes place in about one month. The worm is killed by the alcohol and can be removed through an incision or be allowed to await absorption.

The Annual Report for the year 1932 of the Giza Memorial Laboratory well maintains the excellent standard of its predecessors. The activities of the laboratory include education and clinical consultant work as well as research and routine pathological examinations. The Director, R. P. WILSON, has several interesting observations to make upon the incidence and the relative importance of various ocular diseases in Egypt. Retinitis pigmentosa is very common and accounts for eight per cent. of all retinal and choroidal disease. Myopia, too, is prevalent, and it is a common experience to find it to be a family complaint. Trachoma pure and simple causes but little blindness though it is a common cause of impaired visual acuity ; and nearly all cases of the disease are complicated at some time by a secondary infection which often leads to corneal lesions. Ocular tuberculosis appears to be rare in the country, and, in view of the prevalence of trachoma, the question arises whether any antagonism exists between the two diseases. Dr. TOBGY has successfully treated " Bitot's spots " on the bulbar conjunctiva by painting them with pure carbolic acid. F. H. STEWART contributes an important paper on the significance of the Prowazek-Halberstaedter body in trachoma. He suggests that the bodies result from the phagocytosis of bacteria which, though not themselves the cause of trachoma, may carry the virus of that disease. The inclusions do not occur in trachoma unless it has been complicated by a secondary infection.

The Bulletin of the Ophthalmological Society of Egypt for the year 1933 comprises the papers read at the thirtieth session of the society. Naturally many of these are concerned with the subject of trachoma. MEYERHOF considers that an acute stage of the disease may occur. This has many symptoms in common with acute follicular conjunctivitis, swelling and tenderness of the preauricular gland being one. Granulations invading the upper limbus are, however, characteristic of trachoma. TOBGY comparing the new formed vessels seen in trachoma with those in spring catarrh, has found the former to be more congested and irregular, and to anastomose more freely. In spring catarrh the vessels have a smaller lumen and thicker wall whilst they bleed less readily. Experiments made by OLITSKY suggest that the

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[30] CORNET (Emmanuel). Essai de traitement de la sparganose retro-bulbaire. Deux cas et deux succès.—*Bull. Soc. Med.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 452–455. With 4 figs.

follicular conjunctivitis found in monkeys may be due to a specific organism. AMIN advocates the use of a "bridge-flap" in senile cataract extraction. Some of the speakers in the subsequent discussion appear rather to have exaggerated the difficulty of the technique and to have realized insufficiently that its chief advantage lies in securing a firm and early closure of the wound. TOBGY and ATTIAH review the recent forms of operative treatment for detachment of the retina. *H. Kirkpatrick.*

MALARIA.

i. Collignon (E.). Observations générales sur la campagne antipaludique de 1932 dans le départment d'Alger. [**The Antimalarial Campaigns in Algiers, Constantine and Oran during 1932.**]—*Arch. Inst. Pasteur d'Algérie.* 1933. Dec. Vol. 11. No. 4. pp. 606–614. With 8 figs. on 4 plates.

ii. Ambialet (R.). Observations sur la lutte antipaludique dans le département de Constantine au cours du 2o semestre 1932.—*Ibid.* pp. 615–636. With 10 figs. on 5 plates.

iii. Gouget (R.). Observations générales sur la campagne antipaludique de 1932 dans le département d'Oran.—*Ibid.* pp. 637–643. With 6 figs. on 3 plates.

i. The prosperity of agriculture and its consequent extension have been followed by a decrease in malaria.

The dry season of 1932 was neither too hot nor too damp, and the rains at the end of the summer were sufficient to wash out the breeding places in the wadis (or wide, shallow water courses) without being so plentiful as to create temporary breeding places elsewhere; consequently, there was not very much malaria. An important factor in the reduction of endemic malaria has been the prosperity of agriculture; this has led to the regulation of water-courses and the draining of marshes. The improved standard of living has also played a considerable part in reducing sickness. The impounding of water for irrigation has reduced the number of pools in the water courses, and when the water is returned to the wadis, in the autumn, it flushes out the breeding places. One of the chief dangers to health lies in the improper use of irrigation water.

ii. Prophylactic quinine and antilarval measures give good results with a population concentrated in villages and accustomed to Europeans; they are much less successful with a suspicious scattered population.

The department of Constantine consists of the coastal zone, and the zone of the high plateau. In the coastal zone, there are lakes and vast marshes, but the centres of colonization are generally situated at some distance from these collections of water; on the high plateau, however, water is scarce and the people live near the pools and rivers. The population on the coast is collected in villages; the people are in contact with Europeans and do not mistrust them; the labourers are employed on large estates owned by companies, and it is therefore easy to deal with them. On the high plateau, the people work on their own land where they grow cereals; they have little contact with Europeans, and they mistrust them; they are not collected into well-organized villages, and many of them are nomads. These circumstances make them difficult to deal with.

A considerable increase in malaria occurred in the autumn of 1932, both on the coast and in the highlands, but its effects were much more serious in the latter zone, where there is little endemic malaria and where many of the labourers come from non-malarious districts. Here, cases of pernicious malaria occurred but, in the coastal zone, where there is more endemic malaria and many of the labourers are in a condition of premunition, cases of severe illness were uncommon. Prophylactic quininization is easily carried out in the coastal zone, but not in the highlands.

iii. Malaria is not very severe in this department (Oran), and 1932 was not a bad year. The methods adopted were quininization of the carriers, oiling, clearing and regulation of canals, and the distribution of Gambusia. *W. Fletcher.*

SCHWETZ (J.), BAUMANN (H.), PEEL & BELHOMMET. Contribution à l'étude de l'infection malarienne chez les pygmées de la forêt de l'Ituri (Congo Belge). [**Malaria among the Pigmies of the Ituri Forest.**]—*Bull. Soc. Path. Exot.* 1934. Feb. 14. Vol. 27. No. 2. pp. 199–208.

The rate of malaria infection in pigmies is lower than that of other natives in the forest.

The authors have already reported the results of the examination of 91 adult pigmies and 28 children between the ages of 10 and 15 [this *Bulletin*, Vol. 30, p. 821]. The parasitic index of the adults was 25 per cent., and that of the children was 46 per cent., which was almost the same as the indices of the other natives living in the forest. During the year 1933, they have examined the blood of a second series, comprising 300 pigmies, many of whom were infants. This time they found that the infection rate of the pigmies was much lower than that of the other natives of the forest, but that a larger percentage of pigmies was infected with *Filaria perstans* ; filarial infection becomes more common with increasing age, while malarial infection becomes less common. The exposure to the bites of insects was apparently the same in both groups. *W. F.*

LAL (R. B.) & SHAH (K. S.). **Malaria and Water-Logging. Being a Report on a Study of the Health Conditions prevailing at Chakanwali, Gujranwala District, Punjab, from November 1927 to January 1931, with Special Reference to Malaria in a Water-Logged Tract.**—*Records of the Malaria Survey of India.* 1933. Dec. Vol. 3. No. 4. pp. 583–634. With 11 charts & 2 maps.

Reclamation for agriculture by drainage did not decrease the number of anopheles, nor have much effect on the incidence of malaria, but it improved the health of the population by increasing their prosperity. *A. stephensi* and *A. culicifacies* bred in water with a pH of 9·6.

The Punjab, the Land of Five Waters, stretches from the Himalayas in the north to the desert of Rajputana in the south. Between the five great rivers are strips of country known as the *doabars*. The piece of country with which this report is concerned lies in the Rechna Doaba between the Ravi and Chenab rivers. Before the advent of canal irrigation, the north-western part of this area was fertile, further south the soil was less productive, and irrigation was carried out from wells ; still further south lay a waterless, almost rainless, desert tract. In 1894, the Lower Chenab canal was constructed to irrigate the drier parts of the area, and it commands about 2 million acres of land. Increased prosperity followed, and lasted for some years ; but seepage from the canal and obstruction of natural drainage caused so great a rise in the subsoil water, in some districts, that the land became useless for cultivation. The soil in many parts was salt-bearing, and, with the rise in the level of the subsoil water, saltpetre efflorescence appeared on the surface. The Government acquired, in 1926, 3,465 acres of abandoned land in one of the worst water-logged tracts, and this

constitutes the Chakanwali Experimental Reclamation Farm. The reclamation operations consisted mainly of regulation of crops and an elaborate system of open seepage drains. In addition, a dispensary under the charge of a sub-assistant surgeon was established.

The actual level of the subsoil water was not materially lowered, *but the movement of the subsoil stream was greatly accelerated*, the surface of the land dried rapidly, large areas became available for cultivation, and there was plenty of remunerative work for the tenants. Though many permanent breeding places of anopheles were obliterated, the new drains formed fresh ones, and the number of malaria-carrying mosquitoes was not reduced ; nevertheless the population appeared to have gained enhanced power of recovery from malaria as compared with the people of the control villages outside the farm area. This improvement is attributed partly to the presence of the dispensary, and partly to the better economic conditions resulting from the reclamation operations. The spleen rate was between 20 and 40 per cent. during most of the period of observation. The carrying mosquitoes were *A. stephensi* which bred in the slow-running open drains, and *A. culicifacies* which bred in casual collections of water. These mosquitoes bred prolifically in the highly alkaline water with a pH of 9·6.

W. F.

GUPTA (P.), DAS (Ghanasyam) & MAJUMDAR (Nizamur Rahman). **Further Investigations into the Malarial Conditions at Kachugaon, Goalpara District, Assam, and the Results of Anti-Malarial Measures.** [Abstract.]—*Records of the Malaria Survey of India.* 1933. Dec. Vol. 3. No. 4. pp. 843–849.

A. minimus is the only important carrier in this area. The authors concluded as the result of their observations that the duration of treatment in malaria could be shortened by administering plasmoquine in addition to quinine, and that this reduced the number of relapses. They also concluded that atebrin might be advantageously substituted for quinine, and the duration of treatment shortened thereby. Good results followed the bi-weekly administration of 1/3 grain (0·02 gram) of plasmoquine and 4 grains of quinine as a prophylactic. Children were given euquinine and plasmoquine mixed with milk. Oiling was used on all permanent breeding places once a week, and temporary breeding places, rice fields, and the edges of streams were treated with Paris green ; but these methods were very expensive. *W. F.*

ASSAM MEDICAL RESEARCH SOCIETY. **Report of the Year 1933. Malaria Section** [SAVAGE (J. de la Mare), Malaria Research Officer]. —7 pp.

Rice Bran as a Larvicide.—In water near certain rice mills, no larvae are found. Rice bran dusted on water in petri dishes containing larvae of *A. maculatus* and *A. gigas* killed nearly all of them by suffocation in 24 to 72 hours. Similar results were obtained in field experiments. Rice bran is cheaper than imported soft stone, and is a suitable diluent for Paris green.

Anopheline Survey.—Three to four thousand specimens of each of the three species, *A. maculatus*, *A. minimus*, and *A. philippinensis* were dissected during the three years, 1931–3. The rates of infection were,

respectively, 0·4, 7·5 and 0·1. *A. maculatus* was experimentally infected with M.T. and B.T. parasites but not with quartan. It does not hibernate but feeds throughout the year.

Training classes.—Seven sub-assistant surgeons and two laboratory assistants attended a course in laboratory and field work. *W. F.*

CENTRAL CO-OPERATIVE ANTI-MALARIA SOCIETY LD. **The Fourteenth Annual Report of the Central Co-operative Anti-Malaria Society Ld. held at the Albert Institute on 18th February, 1934.**—57 pp. With 2 maps & 2 plates. Calcutta: 1/2A Premchand Boral Street.

"This Society is a purely non-official organization for improving the sanitary condition of the villages of Bengal, and is supported by voluntary contributions." It assists in the organization of a network of public health societies throughout Bengal, helps them in taking preventive measures against malaria, kala azar, cholera, and other diseases, and acts as an expert advisory body to these societies. The Anti-Malaria League, which was founded in 1908 by Dr. G. C. CHATTERJEE, was in reality the beginning of the present Society. There are now more than 2,000 affiliated societies established in different parts of Bengal. Antimosquito measures, such as filling up ditches, drainage, oiling and clearing, are carried out by voluntary labour and medical aid is given to members through funds raised by voluntary taxation.

The Secretary, Dr. G. C. CHATTERJEE, in his Annual Report for 1933, lays great stress on the interference with the free flow of the rivers as a cause of malaria. The water courses have been dammed for irrigation, they have been bunded to prevent flooding, they have been obstructed by sluices and weirs which block the tidal flow. All these obstructions prevent the free drainage of the country, and they also prevent the free passage of fish which devour the larvae of mosquitoes. Malaria can be readily controlled in limited areas by drainage and the application of larvicides, but it is economically impossible to extend such methods to the whole countryside; rural areas must be dealt with by biological methods such as the restoration of the free flow of water in the rivers, and the free passage of larvivorous fish. *W. F.*

ROBIN (L. A.). Sur l'incidence de l'endémie palustre en Indochine méridionale et ses variations de 1926 à 1932. [**Endemic Malaria in S. Indo-China.**]—*Arch. Insts. Pasteur d'Indochine.* 1933. Apr. No. 17. pp. 11–58. With 18 graphs. [18 refs.]

A general review of conditions as regards malaria in the different zones (see ROBIN, below).

The sanitary and medical services of Indo-China were first occupied with the endemic and epidemic gastro-intestinal diseases of the country, such as dysentery and cholera, which were the gravest causes of illness and death. It is only during the last 15 years that they have turned their attention to malaria. The opening up of the sparsely-peopled jungle of the semi-highlands (*région accidentée de moyenne altitude*, or R.A.M.A.) for rubber plantations, and the importation of labour to work on them, was followed by a serious increase in the disease which often assumed epidemic form. Its persistence in hyperendemic degree

became so serious a menace that, in 1928, the planters solicited the intervention of the Pasteur Institute of Saigon, and an antimalaria campaign was undertaken by Dr. H. G. S. MORIN. The brilliant results achieved by him decided the planters of Cambodia and the service of Public Works to hand over to the Antimalaria Service of the Institut Pasteur, of which Dr. MORIN is the Director, the sanitary care of the coolies working on plantations, roads and railways. Since July 1930, the Governor General has extended the benefits of the antimalaria service to cover the whole country.

Indo-China, from the point of endemic malaria, may be divided into 6 zones :—*Zone* (1). The coast: the water is brackish, the anopheles belong to the *subpictus*, *ludlowi* group, and malaria is sometimes severe. *Zone* (2). The delta: rice is grown, and malaria is almost unknown ; the population is large and cattle are numerous ; the anopheles *sinensis* and *vagus* are abundant, and there is a fair sprinkling of *minimus*. *Zone* (3). The intermediate zone : the "*terrasses*," where there is pasture land. Malaria is endemic, but not serious ; it yields to agricultural development ; the anopheles are of several species, and *A. minimus* is plentiful. *Zone* (4). The semi-highlands or R.A.M.A. at an elevation of 70 to 1,000 feet. This is the zone of hyperendemic malaria. Jungle-clad and richly watered, it cannot be colonized by the local Chams or Cambodians, and even the Moïs are found only in nomad groups. *A. minimus* is present in abundance, *A. maculatus* is usually present, *A. jeyporensis* is sometimes present. *Zone* (5). The high Moï valleys, and the plateaux of moderate altitude in Central Annam. The climate here is less tropical because of the altitude, and there are seasonal variations of temperature which make this zone pleasant for Europeans. It is inhabited by Moïs and is more popular than zone 4. Malaria is sometimes severe, but it is seasonal. Anopheles are abundant ; the species are: *A. jeyporensis*, *A. minimus* and *A. maculatus*. *Zone* (6). This includes the high mountainous country above 3,500 feet. The anopheles are *A. jeyporensis*, *A. fuliginosus* and *A. maculatus*, the last during the warm weather only. *A. minimus* is not found in these regions, and there is no malaria. The population is scanty, because the soil is poor and shallow.

The results of 37,000 blood examinations made at the Pasteur Institute of Saigon, between 1926 and 1932, show that, though malaria occurs all the year round, there are two seasons of maximum intensity. The first occurs in July and the second in December. The December rise in malaria, which is chiefly due to an increase in *P. vivax* infections, coincides with an increase in the numbers of *A. minimus*, the principal carrier ; no similar increase accompanies the July rise, which is chiefly due to an increase in *P. falciparum* infections.

Since the year 1928, when the antimalaria campaign was opened with vigour on the plantations, there has been a considerable and progressive fall in malaria. During the years 1928 to 1932, the percentages of malaria patients admitted to hospital from the estates have been, respectively, 60, 32, 28, 25, 12. During this period, the numbers for the other parts of the country, which serve as a control, have remained more or less stationary. There has been a diminution during the last few years in the proportion of *P. falciparum* infections, as compared with infections by the other species of parasites, and this has led to a diminution in the number of severe cases of malaria admitted to hospital. *W. F.*

ROBIN (L.). Variations saisonnières de l'incidence des diverses variétés d'hématozoaires en Indochine méridionale de 1928 à 1932. (Deuxième note.) [**Seasonal Changes in the Type of Malarial Parasites in Indo-China, 1928–32.**]—*Bull. Soc. Path. Exot.* 1933 Nov. 8. Vol. 26. No. 9. pp. 1147–1153.

The relative proportions of the different species of malaria parasite.

The relative percentages of the different species of malaria parasites in southern Indo-China, for the four years 1928–32, were *P. falciparum* 59, *P. vivax* 25, *P. malariae* 15. These percentages vary during the course of the year. *P. falciparum* is always predominant, especially in the rains of July, while *P. vivax* is more common during the dry season in December than at other times of the year. The fluctuations of *P. malariae* are less marked, but it is rather more common in August and December than in other months. *P. falciparum*, which produces the most severe clinical symptoms, constitutes a greater proportion of hospital malaria than of malaria among healthy carriers ; but with *P. malariae* the reverse is the case. The proportion of *P. falciparum* infections is becoming progressively less though the total amount of malaria has not decreased, and the author ascribes this qualitative improvement to the antimalaria measures which have been adopted.

W. F.

TOUMANOFF (C.). Recherches sur la transmission du paludisme au Tonkin. [**The Transmission of Malaria in Tonking.**]—*Arch. Insts. Pasteur d'Indochine.* 1933. Apr. No. 17. pp. 59–102. With 5 charts, 1 plate & 1 map. [35 refs.]

A. minimus is by far the most important carrier, *A. jeyporensis* comes next.

Dissections of different species of anopheles in Tonking over a period of 28 months have led to the following conclusions :—Five species have been found naturally infected, and these are :—*A. minimus*, *A. jeyporensis*, *A. aconitus*, *A. maculatus* and *A. vagus*. *A. minimus* was found naturally infected in tropical Indo-China for the first time by MORIN in 1928. The highest infection rate is found in this species, and it is the principal vector in the country. The infection rate differs in the different zones. In the deltaic region, precipitin tests which are now being made point to a probable deviation of this species by domestic animals. The amount of malaria in a locality depends very largely upon its physical characters, and in some limited areas the rate of infection is very high. Sporozoite infection of *A. minimus* occurs in both winter (the dry season) and summer (the wet season), but it is highest in the winter which is the time when this anopheles shows its maximum increase. Gland infections have been found in several *A. jeyporensis*, and it is probably an important vector in certain places. *A. maculatus* is difficult to catch in houses, and it is uncertain what rôle it plays in the malaria of Tonking. *A. aconitus* and *A. vagus* are probably not of very great importance as carriers. *W. F.*

KUIPERS (I. J.) & STOKER (W. J.). Een *A. ludlowi*—epidemie in Oost-Java. [**An** *A. ludlowi* **Epidemic in East Java.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1934. Jan. 16. Vol. 74. No. 2. pp. 74–90. With 3 figs. English summary.

An epidemic of malaria conveyed by *A. ludlowi* is attributed to intermittent rainfall on a salt impregnated soil leading to great multiplication of this mosquito.

The fact that an epidemic of some kind was in progress was recognized by the sanitary authorities through the increase of the mortality returns from a definite district. An account is given by the authors of how it was ascertained to be malarial and how the mosquito *A. ludlowi* which breeds in brackish water, was incriminated as the sole infective agent. A large number of mosquitoes were dissected, 146 *A. ludlowi*, 964 *A. subpictus* and 2 *A. aconitus*, with positive findings of stomach oocysts in 44 and salivary gland sporozoites in 36. Altogether 68 *A. ludlowi* were found infected (46·6 per cent.) and none of the other species. All the possible breeding places are considered in detail. During the east monsoon the clayey ground dries up. It is in the west monsoon that water may come to lie for a longer or shorter time. If the rain is continuous, standing water is sweet but if it is intermittent pools are brackish with the salt taken up from the soil. It is the latter condition which is favourable to *A. ludlowi* and which, owing to the rainfall conditions of 1933, led to the appearance of this dangerous mosquito in great numbers. "Shortly stated, the correspondence between the mortality curve, the rainfall curve, and the mosquito curve is the proof offered that the malarial epidemic at Brengkok was a consequence of the abnormal rainfall in 1933 in conjunction with a salt impregnated soil." *W. F. Harvey.*

TEDESCHI (Carlo) & SCALAS (Antonio). Contributo alla biogeografia della malaria in Burhacaba (Benadir). [**Malaria in Burhacaba (Benadir).**]—*Riv. di Malariologia.* 1934. Vol. 13. No. 1. pp. 104–113. With 1 fig. English summary.

The village of Burhacaba (Italian Somaliland) has been regarded as free from malaria, but the authors have shown this to be erroneous. Actual cases of infection, it is true, were few, but the number examined was absurdly small. Of 17 children and 7 adults whose blood was now taken four showed *P. falciparum*, three with gametocytes. Of 200 children up to 10 years of age, 40, or 20 per cent., had enlarged spleen and of 100 adults 26 had enlargement. *Anopheles gambiae* were present in abundance and *A. rhodesiensis* in small numbers. *H. H. S.*

SLIWENSKY (M.). 5 Jahre kombinierte Malariabekämpfung in Bad Gorno-Panitscheri. [**Five Years Combined Antimalaria Measures in Gorno-Panitscheri.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1934. Feb. Vol. 38. No. 2. pp. 74–80. With 3 figs.

Results of antimalarial measures carried out in Bad Gorno-Panitscheri (Bulgaria) over a period of 5 years which commenced in 1928.

The program of the 5 years plan was :—I. Seeking out and treating thoroughly all plasmodium carriers in winter. 2. Removal by drainage of all stagnant water. 3. Antilarval and antimosquito measures during the whole malarial season. 4. Thorough treatment of all newly infected persons during the malaria season. Bad Gorno-Panitscheri is situated in one of the most beautiful parts of Bulgaria. The cost of the antimalarial measures was low, as the whole population gladly took part in carrying them out. As evidence of the improvement following these measures the author states that in 1928/29, 50 anopheles could be caught with ease in the houses in a short time, whilst in the last two years of the campaign only 1 or 2 could be caught with difficulty in the houses, cellars or stables. *E. D. W. Greig.*

PICCININNI (Francesco). Relazione sulla campagna antimalarica in provincia di Milano durante l'anno 1932. (**Report on the Anti-malarial Campaign in the Province of Milano during 1932.**)—*Riv. di Malariologia.* 1933. Nov.–Dec. Vol. 12. No. 6. pp. 1169–1192. With 1 folding map. English summary p. 1218.

This report is too detailed for abstracting, except on very general lines. In the Province the areas dealt with have been divided into 66 Communes, and the population of each is given, the total cases and the percentages. For 36 of them the numbers of foci where anopheles was found—holes, pools, and marshes—the numbers of persons visited, the results of blood examinations and the age distribution of those attacked are given. Among the total population, 209,465 according to the 1931 census, there were 2,526 cases or 1·2 per cent., as compared with 2,851 or 1·36 per cent. Benign tertian was the predominating infection and the species of anopheles found was almost exclusively *A. maculipennis* var. *messeae.*

Apart from the elimination of the many small stagnant pools, there are still marshy areas to be dealt with, while it will be necessary to bank the Adda which at times inundates the adjacent land. At the same time the measures at present in use—treatment of patients and inspection and treatment of rice-fields and other breeding places—must not be neglected. *H. H. S.*

LUTRARIO (A.). La loi italienne du 22 juin 1933 pour diminuer les causes du paludisme. [**The Italian Law of June, 1933, to reduce Malaria.**]—*Bull. Office Internat. d'Hyg. Publique.* 1933. Nov. Vol. 25. No. 11. pp. 1982–1985.

Antimalaria work will be co-ordinated in each Province by a provincial committee. Free quinine and other drugs, and free medical treatment, are to be given to workmen, employees, and their families in malarious areas, at the cost of the concessionaires and contractors. When a man leaves a district he is given a health card which entitles him to free treatment and quinine for himself and his family for a period of six months. The family of a man who dies from pernicious fever is entitled to the same compensation as if he had died from the result of an accident. On the advice of the committee the prefect of a province can stop any work which interferes with drainage, and no quarries or excavations can be made without his sanction. Through him, the committee has power to enforce the adoption of antilarval measures and the screening of houses for peasants and labourers. *W. F.*

MARTINI (E.). Älteres ueber Malariaepidemiologie. [**Epidemiology of Malaria. An Old Record.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1934. Jan. Vol. 38. No. 1. pp. 43–46.

An old contribution to the recently studied question of malarial infection contracted in autumn becoming active for the first time in spring.

BRAUNE in the *Archiv für Heilkunde,* 1870, published an account of 11 out of 12 persons who spent August and September 1868 at Borkum, an East Frisian Island, and developed tertian fever in a malaria-free locality in the spring. At the same time 7 persons developed malaria in the spring after a late summer visit to Norderney, in the same group of islands. The author diagrammatizes these 18 cases, four of whom

had fever in the autumn, the first attacks in the spring occurring in March (4), April (5), May (6). It appears that the summer of 1868 was hot and dry, so that conditions were favourable for the spread of malaria. *A. G. B.*

WEYER (Fritz). Verlauf der Malaria in Ostfriesland 1932 und 1933. [**Malaria in E. Friesland, 1932 and 1933.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1934. Mar. Vol. 38. No. 3. pp. 131–132.

Table 1 shows the new malarial attacks in East Friesland in 1932 and 1933, and Table 2 the monthly average temperature in 1931 and 1932. To the question whether infection occurs in summer or autumn the author replies that *A. maculipennis* can be found in the houses in June, July and the beginning of August, but never in autumn or winter. The average temperature in these months was 14·9° in 1931 and 16·5° in 1932, so that the conditions for transmission in the latter year were more favourable.

Tables 1 and 2 (combined)

East Friesland	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
Monthly Average Temperature (°C.) in 1931*...	—	—	6·4	13·7	14·7	17·3	15·8	11·9	9·3	—
Fresh cases of Malaria in 1932	0	4	2	5	6	0	2	1	2	22
Monthly Average Temperature (°C.) in 1932*...	—	—	7·3	12·7	14·9	18·7	17·5	14·9	9·0	—
Fresh Cases of Malaria in 1933	1	20	26	52	54	22	3	2	1	181

*As recorded at Emden.

A. G. B.

BARBIERI (Antonio). Resultados alcanzados en la lucha contra el paludismo en la última década. La redución de la enfermedad en los principales centros poblados. [**Results of Antimalaria Measures in the Last Ten Years in the Argentine.**]—*Prensa Méd. Argentina.* 1933. Feb. 15. Vol. 20. No. 7. pp. 375–381. With 6 figs.

The records presented in this article are given in somewhat general terms, figures being few. There has certainly been a great improvement in the incidence of malaria in the past ten or twelve years, as shown by the following percentages of the population in which "parasites were seen in the blood, mostly of school children": ten years ago, in the towns of Salta 22·9, Catamarca 21·6, Jujuy 21·3, Tucumán 15·2; and in other places, Monteros 47·7, Güemes 37·2, Metán and Rosario 36, and Concepción 29·7 per cent. are the chief. At the last record, 10 years later, the corresponding figures were: Salta, urban 6 per cent., Jujuy town and district 3·17, Tucumán urban 0·34, suburban 3·08, rural 10·3, Güemes 11·7, Metán 3·9, Rosario de la Frontera 17·1, Concepción 1·7. In the majority the prevalence has been reduced to one-fifth or less and in some, *e.g.*, Tucumán town, Concepción, Monteros and Medinas, malaria has been practically eradicated.

The usual methods had been adopted, general bonification, oiling and the use of Paris green, free issue of quinine, and educational propaganda in the schools. The article is illustrated with photographs showing canalization of streams at Jujuy, Monteros and Rosario de la Frontera.

H. H. S.

SCHWETZ (J.), BAUMANN (H.), PEEL & DROESHAUT. Sur la différence de l'infection malarienne, d'après l'âge, constatée chez les nourrissons noirs de l'agglomération de Stanleyville (Congo Belge). (**The Differences of Malaria Infection according to Age verified in the Negro Babies of Stanleyville (Belgian Congo).**)—*Riv. di Malariologia.* 1933. Nov.–Dec. Vol. 12. No. 6. pp. 1147–1154. English summary (9 lines) p. 1217.

The infection of infants under 3 months old is relatively feeble and is due to *P. falciparum* ; gametocytes are scarce. Scanty schizonts of *P. malariae* appear after the first month. After the 3rd month *P. vivax* appears ; all parasites increase in numbers and gametocytes become plentiful. The parasites of all species reach their maximum towards the end of the first year, at which time gametocytes are very numerous. *P. vivax* disappears by the time the 5th year is reached, and *P. malariae* by the 15th year. A few *P. falciparum* remain in adult life, but gametocytes are very rare ; in short, the condition, in adults, resembles that which exists in very young babies. *W. F.*

SERGENT (Edmond), SERGENT (Etienne) & CATANEI (A.). " Maisons à paludisme " et " instinct de retour à la pâture " chez les moustiques. [**" Malaria Houses," and the " Hospice Return Instinct " in Mosquitoes.**]—*C. R. Acad. Sci.* 1933. Dec. 26. Vol. 197. No. 26. pp. 1711–1713.

Describes an experiment in which cages and canaries took the place of houses with their human inhabitants.

There are often houses in malarious places where fever recurs year after year while those around it remain comparatively free. It has been suggested that these " malaria houses " are such, firstly, because they contain a good infector and, secondly, because mosquitoes have an instinct which drives them to return, after depositing their eggs, to the place where they fed before.

The authors devised a method of testing this hypothesis by a practical experiment, in which cages represented houses, the inhabitants were canaries, and the breeding-place for mosquitoes was a tub nearby. In one cage, known as " Maisonette à virus " were two canaries, one of which was infected with *P. relictum*, while the other was healthy ; in the other cage, known as " Sans virus," were two healthy birds. The maisonettes and the breeding pool were isolated by mosquito gauze, but two gauze tunnels, several metres long, led up from the pool, one to each maisonette, and up these tunnels *Culex pipiens* came to feed on the canaries. If the hospice return instinct played a part, the mosquitoes which had become infected in " Maisonette à virus " would have returned there after depositing their eggs in the pool, and would have infected the healthy bird which shared quarters with the one which was infected. At the same time, only the mosquitoes which had fed in " Sans virus," on its healthy inhabitants, would return to feed there again and consequently this maisonette would remain free from

infection. This did not happen; the mosquitoes did not always return for their second meal to the place where they had enjoyed their first. The apparatus was duplicated and the experiment was repeated several times, with the result that 17 canaries were infected in the "maisonette à virus" and 18 in the "maisonette sans virus." Some other explanation of "malaria houses" must be looked for. *W. F.*

HIMMELSBACH (C. K.). **Malaria in Narcotic Addicts at the United States Penitentiary Annex, Fort Leavenworth, Kans.**—*Public Health Rep.* 1933. Dec. 8. Vol. 48. No. 49. pp. 1465–1472.

The author reports another series of cases in which malaria was carried from drug-addict to drug-addict by means of the syringe [see FAGET, *ante*, p. 164].

This series comprised 28 inmates out of 1,596 at the United States Penitentiary Annex, Fort Leavenworth, Kans. In 8 cases there was fair proof of needle transmission, in 6 it was possible, and in 14 the malaria was recurrent or unexplained. The sharing of "shots," the lack of sterilization, and the use of the intravenous route by the donor seem to be essential conditions for transmission. Several of the cases appear to have attended morphia inoculation parties in the gaols from which they were transferred to the penitentiary. *W. F.*

RODHAIN (J.). Notes cliniques sur la malaria chez les Européens rentrant du Congo Belge. [**Malaria in Europeans returning from the Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1933. Dec. 31. Vol. 13. No. 4. pp. 421–427. With 1 graph.

A case of *P. ovale* infection, and a case of congenital malaria.

The author has met with several cases where pregnant women have jeopardized their lives by stopping their prophylactic quinine through fear of abortion. He gives details of such a case, with a mixed infection of *P. ovale* and *P. falciparum*. He also describes a case of latent congenital malaria. A lady from the Congo had an attack of benign tertian on the day after her confinement in France on April 24. The author examined the baby's blood on June 27 and was surprised to find benign tertian parasites—not only because the baby had never been in a malarious country, but because it had no fever or signs of malaria.

W. F.

BOYD (Mark F.). **Observations on Naturally Induced Malaria.**—*Southern Med. Jl.* 1934. Feb. Vol. 27. No. 2. pp. 155–159.

The author reviews the observations on induced malaria which he made at the Florida State Hospital, particularly as regards the resistance of negroes to infection (see this *Bulletin*, Vol. 30, p. 852, and *ante*, p. 166).

Patients were therapeutically infected with four local strains of *P. vivax* by the bites of *A. quadrimaculatus*. The author considers that white patients who are not harbouring a latent infection are invariably susceptible, and that failures are due to deficiencies of the sporozoites. In 103 primary inoculations of white patients, there were only 16 failures, and 12 of these were bitten a second time without a single failure. Negroes are almost insusceptible; of 14 inoculated, none became ill, and only 5 had transient parasites in the blood. In order

to determine if this immunity is acquired or racial, a negro child, five years old and free from malaria, was exposed to the bites of infected mosquitoes. The child remained uninfected although white patients bitten by the same mosquitoes contracted malaria. The density of parasites in the blood at the *beginning* of a clinical attack is the best means of distinguishing a primary attack of benign tertian from a recurrence; in a recurrence, the parasites are more numerous and the spleen may be enlarged. When the attacks have been allowed to progress for some time they are singularly amenable to quinine. Infection with *P. falciparum* has been employed in a few cases in order to make malaria therapy available to negro patients. Negroes possess an appreciable resistance to this species of parasite, but it is far less than the resistance to benign tertian. Limited experience with quartan malaria suggests that it is unsuitable for naturally induced malaria therapy, largely because the supply of infected mosquitoes cannot be frequently renewed. Judging from the few cases inoculated, negroes, as well as whites, appear to be highly susceptible.

The extrinsic incubation periods in the mosquito, at 20°C. were: benign tertian, 17 days; subtertian, 23 days; quartan, 35 days. The intrinsic incubation periods in the patients depended upon the dose of sporozoites injected. They were: in benign tertian, about 15 days; subtertian, 11 days; quartan, 27 to 42 days. Gametocytes appear: in benign tertian, from the onset of fever; in subtertian, about the end of the first week; in quartan, after several months. The gametocytes in benign tertian are more abundant in the primary attack. *W. F.*

LOWE (John). **Studies in Untreated Malaria.**—*Indian Med. Gaz.* 1934. Jan. Vol. 69. No. 1. pp. 16–23. With 4 charts.

Sixteen cases of benign tertian were left untreated. Eleven were arrested spontaneously in about a week. Subtertian could not be left without treatment for longer than 48 hours. The stages of fever in benign tertian resembled those described by JAMES, but the onset of quotidian fever was more sudden.

The author studied the course of fresh *P. vivax* infection in 37 inmates of the Leprosy Hospital, Dichpali, Hyderabad, who had not suffered from malaria for a year or more, but who had probably been infected at some period in their lives, because they lived in a country where malaria was endemic. JAMES has found, in primary infections with *P. vivax*:—(1) An initial stage of subcontinuous, or remittent, fever lasting 2–5 days, with several crops of parasites maturing at different times. (2) A developed stage of quotidian intermittent fever with rigors, associated with two crops of parasites and lasting about 10 days. (3) A terminal stage, characterized by tertian fever, which develops when one of these crops dies out. In relapses and second attacks he found that the fever was tertian from the beginning. In the author's series JAMES's initial stage was missing; the fever began as intermittent quotidian with rigors, associated with two broods of parasites in the blood. None of the series passed on to JAMES's third, or "developed stage" of tertian paroxysms, because they either cleared up spontaneously, or were given quinine, before it was reached. When relapse occurred, the fever was always tertian, as noted by JAMES. The absence of JAMES's initial stage of subcontinuous fever is ascribed by the author to former attacks of malaria in the distant past. JAMES found that in reinfections the fever—like that of the relapse—was

tertian from the beginning ; but, JAMES's reinfections occurred within 5 months of the first infection, whereas the first infection in the author's cases had occurred years before.

Sixteen cases were left untreated. Spontaneous arrest took place in 11 of these, after an average period of 6 days ; in the remaining 5, quinine was given after a few days because the patients were distressed. There were 2 relapses which subsided spontaneously among the 11 untreated cases ; there were no relapses, within a period of 6 months, among the remaining 29 who were given cinchona febrifuge 24 grains daily for one week, followed by 12 grains daily for a second week.

Twenty-one cases of subtertian were investigated. They began more gradually, without the sudden onset and rigors of benign tertian. Soon there was some collapse and vomiting and in all cases it was necessary to give quinine after 48 hours, if not before. The temperature was remittent, but never normal, because sporulation was continuous. *W. F.*

LEAGUE OF NATIONS. HEALTH ORGANISATION. **Malaria Commission. Ten Years of Activity of the Commission.**—C.H./Mal./212. 29 mimeographed pp. Geneva. 1934. Mar. 1.

An interesting synopsis of the work of the Commission.

" In the history of malaria, too often the study of a definite problem in a country has led to general conclusions which have later proved altogether inapplicable to other countries The Malaria Commission has been aware of this fact since its very beginning and has always stressed the importance of co-ordinated international research."

Poverty and starvation, the migration and mingling of races, and the disorganization of public health services, were the cause of a tremendous increase in malaria during and after the war. In Italy, the mortality from malaria before the war was 60 per million, but by the end of it, this figure had risen to 320, and only fell to the pre-war level five years later. The malaria morbidity in Russia had never risen above 3,500,000 before 1914, but in 1923, it was 13,500,000. A similar increase occurred in other parts of the world, and the disease reappeared in some countries which had been free from it for many years. Under these conditions, the malaria problem became a serious medico-social question and offered an excellent opportunity for international assistance. A Sub-Commission composed of six expert malariologists was set up in 1923 by the Health Committee of the League. The size of the Sub-Commission, now called the Malaria Commission, grew gradually until to-day (1933) it consists of 7 members who are also members of the Health Committee, and of 47 experts and corresponding members. The first problems which came before the Commission were (*a*) anophelism without malaria ; (*b*) the production and sale of quinine ; (*c*) epidemiological enquiries in a number of heavily infected countries. The Commission decided to undertake tours in connection with these investigations. During the first tour, which was made in 1924, information was collected in Bulgaria, Greece, Italy, Rumania, Russia and Yugoslavia ; in the following year Spain and Palestine were visited ; in 1926, Corsica and Sicily ; in 1927, the United States ; in 1929, India. In Sicily, " the development of ' *bonifica* ' works and the improvement of economic conditions, combined with the treatment of cases, showed the value of the ' *bonifica integrale* ' which has nowhere succeeded as well as in Italy, thanks to the close collaboration of the

Government. As a result of this work two-thirds of the soil of the island which had previously been submerged was rendered useful for agriculture."

The experience gained by the Malaria Commission now allows them to help countries which ask the League of Nations to assist in the reorganization of public health. For example, a member of the Commission made a malaria survey of Siam in 1931, and his recommendations were communicated to the Siamese Government.

The Commission have collected information concerning the prevalence of malaria throughout the world. Ninety-three health administrations, representing three-quarters of the population of the world, replied to an inquiry on this question, and, from their replies, it appeared that some 18 million people were treated for malaria in one year. This did not include countries such as China and Brazil, for which figures were not available and it followed that the real number was much larger.

An analysis of the factors determining the epidemiology of malaria, and a study of the various methods of antimalaria work, enabled the Commission to establish a number of principles as regards antimalaria work *in Europe*. It was agreed that before any method was decided upon, it was, in the first place, essential to treat the sick, then to kill the malaria parasite, either by treating the patient, or by slaughtering the mosquitoes in the houses.

International courses of instruction in malariology have been organized under the auspices of the League since 1926. Theoretical and laboratory work occupy the first month of the course, and are followed by two months field work in a malarious country. Scholarships are granted by the League, by the Rockefeller Foundation, and by health administrations. The conditions affecting malaria in the tropics differ from those in Europe, and the Malaria Commission has therefore organized a course of instruction in Singapore which will be followed by field work in one of the neighbouring tropical countries. The first course begins on April 30, 1934. Individual scholarships have been given to malariologists in various countries, in order to enable them to see the antimalaria work which was being done in other places.

A meeting was held at Geneva in June 1928, attended by the leading malariologists of the world, at which it was decided that the following problems warranted international co-ordinated research. (1) Treatment and its importance in prophylaxis. (2) Housing; biology of anophelines in connection with shelters; the influence of different factors upon the biology of anophelines and upon epidemiology. (3) Anophelism without malaria, and malaria in deltas. As the result of their enquiry into the consumption of quinine the commission recommended a standard formula for a mixture of the total alkaloids of cinchona, known as totaquina (this *Bulletin*, Vol. 29, p. 461; Vol. 30, p. 477); trials of this product have been made in a number of countries and a report will appear shortly. Plasmoquine-quinine and quiniostovarsol have also been investigated under the auspices of the Commission.

A general report on the therapeutics of malaria, based upon controlled experiments made in connexion with the malaria-therapy of mental diseases was published by the Commission in 1933 (this *Bulletin*, Vol. 30, p. 837). The question of anophelism *sine* malaria has been investigated especially in the deltas of the Danube, Ebro, Po and Rhine (*ante*, CANTACUZENE *et al* and SWELLENGREBEL, p. 162) and

several reports have been published, in which it has been shown that when the equilibrium of conditions in a delta is disturbed by building or agricultural developments, malaria may follow. Reports have also been published in connexion with Housing in Relation to Malaria (*ante*, CHRISTOPHERS & MISSIROLI, p. 158). *W. F.*

SERGENT (Edm. & Et.), PARROT (L.) & DONATIEN (A.). Prémunition et immunité dans le paludisme et dans d'autres maladies. [**Premunition and Immunity in Malaria and Other Maladies.**]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933. Nov. 30. Vol. 27. No. 3. pp. 277–280.

A note on premunition apropos of Professor J. G. THOMSON's paper [this *Bulletin*, Vol. 30, p. 827].

The authors proposed the term " premunition," in 1924, to indicate a particular form of immunity characterized by a *tolerance* of the host's tissues with regard to the virus with which it is chronically or latently infected, and also a *resistance* of the host to fresh infection with regard to that virus. This resistance is contemporaneous with the latent infection, and ceases when it is cured. Premunition is a co-infective state, but immunity is a post-infective state. Premunition is not limited to plasmodial infections, but occurs also in infections with Brucella, Bartonella and syphilis. CALMETTE adopted the word " premunition " to define the resistance conferred by his vaccine B.C.G. Premunition is sometimes followed by immunity and several examples of this are given in connexion with the infection of animals with *Trypanosoma marocanum.* *W. F.*

KLIGLER (I. J.) & MER (G.). **The Development of Immunity against Malaria in Children under Ten Years of Age.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933. Nov. 30. Vol. 27. No. 3. pp. 269–276. [16 refs.]

Children acquire very little immunity to malaria until they are over 6. Children should be used for testing antimalaria drugs.

Children in a hyperendemic area constitute the greatest reservoir of parasites. A drug which is therapeutically efficient for adults may be much less useful for children. Young animals do not develop immune bodies readily. They succumb sooner to experimental infection than older animals : *e.g.*, paratyphoid epidemics among guineapigs, trypanosomiasis in rats and mice, and amoebic infection in cats. Young animals have less complement in their serum ; they elaborate fewer antibodies, and these more slowly, than old ones. The authors carried out continuous observations over a period of two to three years on 95 children living in the hyperendemic area of Huleh, in Palestine. They found that the percentage of children infected did not decline until the sixth year was reached, though the intensity of infection was less after the fourth year of age. The observation of CHRISTOPHERS and others, that two years residence in a hyperendemic area confers immunity, does not apply to children. Children relapse more quickly after treatment, and they give a higher reinfection rate. Antimalaria drugs should be tested on children under six years of age, in order that the efficiency of the drugs may be judged apart from the complications introduced by the immunity of the host. *W. F.*

GILL (C. A.). **Immunity in Malaria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933. Nov. 30. Vol. 27. No. 3. pp. 281–284.

The author discusses several points raised by Professor J. G. THOMSON in his paper on Immunity in Malaria [this *Bulletin*, Vol. 30, p. 827]. He also criticizes the application of knowledge gained during the treatment of general paralysis by malaria therapy to the problems of immunology and epidemiology. For example, JAMES has been led to conclude, on the basis of such experimental transmissions, that each species of malaria parasite embraces numerous strains possessing varying antigenic properties (*tom. cit.*, p. 76). These somewhat startling conclusions are difficult to reconcile with observations made in India. In JAMES's experiments the subjects were not normal individuals but syphilitics. Secondly, they may have had numerous drugs administered to them, such as arsenical preparations, sedatives and hypnotics, whose influence upon the malaria parasite is unknown. It has been found in Rangoon that patients with general paralysis are refractory to infection and cannot easily be reinfected. It is questionable whether experiments on such patients should be regarded as clean experiments. *W. F.*

ROUBAUD (E.). Le point de vue anophélien dans l'anophélisme sans paludisme, en Europe. [**The Anopheline Standpoint in Anophelism without Malaria.**]—*Bull. Soc. Path. Exot.* 1933. Dec. 13. Vol. 26. No. 10. pp. 1215–1233. [11 refs.]

A masterly review of the theory of zoophilous deviation by its author.

The author was presented with the Laveran gold medal of the Société de Pathologie Exotique, in the presence of Mme. A. LAVERAN, at a meeting held on December 13, 1933. He subsequently read this paper in which he reviews the question of anophelism without malaria and cites much of the work which has been summarized in this *Bulletin* [see Vol. 30, p. 833 for references]. He does not hold the view, sometimes attributed to him, that the mere presence of numerous domestic animals is sufficient to produce zoophilic deviation of anopheles.

He began, by referring to the many parts of Europe which, though malarious in the past, have become healthy in spite of the persistence of great numbers of anophelines. Though these anophelines readily convey malaria under experimental conditions, they do not do so in the field, and though many cases of malaria were repatriated into such districts at the end of the war, the slight outbreaks of malaria which resulted soon died out, and the disease did not become endemic. There is some natural barrier against the spread of malaria in these areas. The author commenced his work on the problem in 1919, in Corsica. *Anopheles maculipennis*, the chief European carrier, has a distribution extending from latitude 30°, which is south of the Mediterranean, to latitude 65°, which is within the arctic circle. It is present not only in the unhealthy regions, but also in the healthy. There exists, however, an important biological difference between the races occupying these different regions ; those in the unhealthy districts prefer to feed on man, while those in the healthy districts prefer to feed on animals. C. WESENBURG-LUND, at about the same time as the author and working independently in Denmark, arrived at the same

conclusion that anophelism without malaria was due to the misanthropy of the anopheline population.

The author has studied, in the insectarium, 15 strains of mosquitoes sent to him by aeroplane from different parts of the world, and he has been able to divide them into two classes by their feeding preferences. Three strains, one from the Pontine Marshes, one from the south of Spain, and one from Algiers, preferred to feed on man; all the other strains were zoophilous. The androphilous races have a more feeble maxillary armament ("paucidentate") than the zoophilous, and therefore cannot pierce the thick skins of animals so easily. The author also refers to the differences in the eggs of the different races [see VAN THIEL, this *Bulletin*, Vol. 30, p. 831]. He then passes on to consider the work of the Dutch investigators. In Holland, there used to be two malaria seasons, one in the spring and another, more severe, in the autumn; but, to-day, the autumn epidemic does not occur; only the spring epidemic remains, and it has been shown that this is due to infections contracted during the late autumn and winter, from the bites of mosquitoes which have sheltered in human habitations during the cold months. The severe autumn epidemics which occurred a few generations ago have disappeared because, during the summer, the mosquitoes feed on animals. The artificial warmth of the houses in winter is sufficient to permit the development and transmission of benign tertian parasites by the mosquitoes which chance to shelter there, but it is not sufficient for the transmission of *P. falciparum*, and consequently malignant tertian has disappeared from northern Europe. Only one (*atroparvus*) of the two races of *A. maculipennis* found in Holland carries benign tertian during the winter. Though it feeds repeatedly, its eggs do not develop until the spring. The other race is larger and stores up fat in the autumn which enables it to hibernate out of doors without feeding during the winter. If it is kept in a warmed room during the cold weather, it will continue to feed like *atroparvus*; but if it feeds, its eggs develop and it is killed by the cold when it flies out to deposit them. *Atroparvus* breeds in brackish water, and in those parts of Holland where there is no brackish water there is neither *atroparvus* nor malaria. Both the Dutch races of anophelines are zoophilous, and there are parts of France, such as the vast marshes of the Vendee, where *atroparvus* is present, but does not attack the inhabitant unless the number of animals is much reduced.

Will the mere introduction of domestic animals into a malarious district be sufficient to make it healthy? The author replies in the negative. Malaria is prevalent in many parts of southern Europe where cattle are abundant; deviation by cattle is almost entirely limited to the colder countries in the north of Europe. It is not merely a matter of temperature—zoophilous deviation is present in certain parts of Italy—but rather of the way the animals are housed. In the north, the animals are housed in closed buildings which protect them from the cold; but in the south they are left in the open, or kept in open shacks. The anophelines are more readily deviated by the animals in the closed buildings, for the insects do not feed readily except under shelter. The northern European has seen malaria disappear from agricultural districts, not because of his colder climate, or because of better hygiene, but because he houses his animals better than his brother in the south. Permanent stables are the first condition of prophylaxis by animals through selection of zoophilous races. Other factors are tilling of the soil and drainage, by which floods are prevented

and the proportion of mosquitoes to animals is kept constant. Men must not sleep under the same roof as their animals—a practice which is too frequent in poor countries.

The development in Europe of a state of anophelism without malaria, based upon the selection of zoophilous races of anopheles, implies a complex of influences far more involved than the multiplication of animals. Our men of the soil, by unremitting toil to improve the lot of man and beast, have unwittingly succeeded in a vast experiment, which consisted in nothing less than fixing and stabilizing the zoophilous preference of the anopheline fauna. *W. F.*

VAN THIEL (P. H.). Waarom is het voorkomen van malaria in Nederland tot enkele streken beperkt? [**Why is Malaria in Holland confined to Certain Districts?**]—*Nederl. Tijdschr. v. Geneesk.* 1934. Mar. 3. Vol. 78. No. 9. pp. 997–1007. [Refs. in footnotes.] English summary.

The author argues that the density of the anopheles population, especially in August, should be taken into consideration, in addition to differences in the hibernation of the large- and small-winged races of *A. maculipennis*, in order to explain the phenomenon of anophelism without malaria in Holland. He also states that the spring peak of malaria is probably due, at least in part, to the efflorescence of latent infections acquired in the previous July or August, and not in the late autumn, as is generally supposed. [See WEYER, above.] *W. F.*

MENON (T. Bhaskara) & ANNAMALAI (D. R.). **Nephrosis in Malaria.**—*Jl. Trop. Med. & Hyg.* 1933. Dec. 15. Vol. 36. No. 24. pp. 379–381. With 3 figs.

A description, with photographs, of the diseased kidneys of a woman infected with malaria, who was found in a dying condition.

A Hindu woman was picked up unconscious in the street and brought by the police to the hospital where she died before a clinical examination could be made. Spleen smears showed malaria pigment arranged in small clusters and rings inside the blood cells and endothelial cells, an appearance which is commonly met with when an examination is made some time after death from malaria. The kidneys were much enlarged and there were degenerative changes in the tubules with only slight changes in the glomeruli. The epithelium of the convoluted tubules was necrotic and formed casts. Clusters of neutral fat globules and doubly refractive fat were present. "The presence of malarial pigment in the epithelial cells of the proximal convoluted tubules raises the interesting possibility that this is the hypothetical toxin that is responsible for the nephrosis." *W. F.*

CAROTHERS (J. C.). **An Investigation of the Etiology of Subacute Nephritis as seen among the Children of North Kavirondo.**—*East African Med. Jl.* 1934. Feb. Vol. 10. No. 11. pp. 335–336.

Numbers of cases of nephritis associated with anasarca are admitted to Kakamega Hospital. The incidence of subtertian malaria and of intestinal parasites proved to be the same in these cases as in patients who were suffering from other diseases, but 67 per cent. of the nephritic children were suffering from quartan malaria, while the rate among

other children was only 8 per cent. Subacute nephritis has occurred in 36 per cent. of all cases of quartan malaria admitted [see this *Bulletin*, Vol. 27, p. 508 ; Vol. 28, p. 131]. *W. F.*

LANDEIRO (Fausto). Splénographie et expression algébrique des splénogrammes. [**Splenography and the Algebraic Expression of Splenograms.**]—*Arquivos Inst. Bact. Camara Pestana.* 1933. Vol. 7. No. 1. pp. 101–112. With 15 figs.

The author's splenograph is a lattice-like instrument, on the principal of "lazy-tongs," or of the apparatus which used to be advertised for tracing enlargements of photographs. In order to chart a spleen, he first marks out its limits on the patient's abdomen with a grease pencil. He then goes over this line with the pointer on the long arm of the splenograph, and, while he does this, a pencil at the end of the short arm reproduces this outline, a fifth of the size, on squared paper. The number of the squares multiplied by five equals the size of the spleen in square millimetres. The index of splenic reduction proposed by the author is as follows :—

$$\text{Irs}=\frac{\text{rs}}{\text{d}}=\frac{(\text{A1}-\text{A2})\times 5}{\text{d}}$$

A1 = Number of squares enclosed by outline on the splenogram at the first observation.
A2 = The same at the second observation.
d = Number of days between the two observations.
Irs = Index of splenic reduction.

W. F.

MACKAY (R.). **A Note on Congenital Malaria.**—*East African Med. Jl.* 1933. Nov. Vol. 10. No. 8. pp. 246–249.

Blood-films were prepared from the severed ends of the umbilical cord and from the infant's heel, by the sister-in-charge, in 22 maternity cases. *P. falciparum* was never found in blood from the foetal end of the cord, it was found 3 times in blood from the maternal end, and 7 times in blood from the infant's heel. Unrecognized infection may account for many deaths in early infancy. *W. F.*

i. JOHNSON (P. D.). **Treatment of Malaria in Europeans by Atebrin with Special Reference to the Relapse Rate.**—*Brit. Med. Jl.* 1934. Mar. 17. pp. 473–477. With 2 figs.
ii. MACMAHON (E. J. R.). **Treatment of Malaria with Atebrin.**—*Ibid.* pp. 477–478.
iii. FRANKLIN (E. Morris). **Malaria in a European treated by Atebrin by Mouth and Intramuscularly.** [Memoranda.]—*Ibid.* pp. 482–483.

i. Atebrin is superior to quinine. The relapse rate in Asiatics is 5 to 10 per cent. ; in this series of Europeans it was 43 per cent. The toxicity of plasmoquine is enhanced by combination with atebrin.

Forty-nine cases of malaria (29 B.T. ; 17 M.T. ; 3 mixed) in Europeans were treated in Batu Gajah Hospital (F.M.S.) with atebrin in tablets of 0·1 gram three times a day for adults and in smaller quantities for children. The children took the drug well ; one baby of 8 months was given 0·1 gram daily, without ill effects. Atebrin caused no tinnitus or deafness, and patients were unanimous in preferring it to quinine. The

shortness of a course of atebrin treatment was another point in its favour, as was also the absence of the vomiting which sometimes follows quinine. A patient in whom quinine produced urticaria and asthma was able to take atebrin with impunity. The administration of larger doses of atebrin, or the prolongation of the course beyond 5 days, had no apparent advantage. The duration of fever and parasites in Asiatics under treatment with atebrin is about 15 hours less than in Europeans. This is probably due to the greater immunity of the Asiatics. The relapse rate in Asiatics after atebrin treatment is 5 to 10 per cent., but, in this series of Europeans, 43 per cent. relapsed within 6 months, and the author considers that the claims of atebrin have been exaggerated in this respect. No toxic symptoms were observed while the patients were in hospital, but 6 suffered from pain in the epigastrium after their discharge ; it was unassociated with vomiting, but was intensified by food. These symptoms were severe in two cases, but they yielded to treatment with milk and alkalis in a few days. Plasmoquine was not given with the atebrin, but several patients were admitted to hospital suffering from abdominal pain, vomiting, and cyanosis as the result of treatment with this combination in their own homes. The doses of plasmoquine do not appear to have been large, and the author thinks that it is more toxic in combination with atebrin than when it is given by itself [*ante*, pp. 168 and 169].

ii. Dr. E. J. R. MacMahon gives an account of 50 cases of malaria in Trinidad treated with atebrin and plasmoquine compound. He states that, " any complications arising as the result of treatment were, I am convinced, due to the use of plasmoquine co."

iii. Dr. E. Morris Franklin describes a case of severe subtertian infection admitted to the European Hospital at Accra. Atebrin 0·1 gram three times a day was prescribed, but, as there was no improvement after about 44 hours, the patient was given 0·1 gram of atebrin by intramuscular injection twice during the third day and once on the fourth ; the oral doses were continued in the meantime. Improvement followed the first injection almost immediately [possibly due to the atebrin already given by the mouth] and was uninterrupted. *W. F.*

MANWELL (Reginald D.). **Effect of Atebrine on Avian Malarias.**—*Proc. Soc. Experim. Biol. & Med.* 1933. Nov. Vol. 31. No. 2. pp. 198–199.

Atebrin acts differently in different kinds of bird malaria.

Atebrin was given orally to female canaries for 7 to 9 days. The dose was 2 mgm. dissolved in 100 cm. [*sic*] of water twice a day. Birds were infected with *Plasmodium rouxi*, *P. circumflexum*, and *P. cathemerium* by blood inoculation. Some birds were treated during the incubation period, and others during the acute stage. Atebrin appeared to be a perfect specific against *P. rouxi*, but it was not possible to cure or prevent infection with the other two species. [See this *Bulletin*, Vol. 29, p. 710.] *W. F.*

MANWELL (Reginald D.). **Quinine and Plasmochin Therapy in Infections with** *Plasmodium circumflexum.*—*Amer. Jl. Trop. Med.* 1934. Jan. Vol. 14. No. 1. pp. 45–59. [24 refs.]

Related species of parasites respond differently to chemotherapy and each species may require a separate drug for effective treatment.

Plasmodium circumflexum was first described by KIKUTH, in 1931. The average incubation period after the intramuscular inoculation of canaries was 8·6 days ; it varied with the dose. The average duration of the acute period was about a week ; the mortality was higher than in *P. praecox* infection and equal to that of *P. cathemerium* ; 25 per cent. of the birds died. Relapse is common during the first 6 weeks of the chronic stage, and is often fatal.

Treatment with quinine or plasmoquine during the incubation period will prevent the onset as long as it is continued ; sometimes it will abort the infection altogether, but usually the attack comes on when the drug is stopped. Treatment during the acute stage is less effective ; plasmoquine quickly clears the peripheral blood, quinine is relatively ineffective, but neither of them sterilizes the bird and relapses are common. The combination of quinine with plasmoquine does not strengthen the action of the latter.

" The susceptibility of the five species of avian plasmodia here considered to treatment with quinine and plasmochin appears to be as follows, the most susceptible being given first."

Quinine	Plasmoquine.
1. *P. rouxi*	1. *P. elongatum*
2. *P. praecox*	*P. rouxi*
3. *P. cathemerium*	2. *P. praecox*
4. *P. circumflexum*	3. *P. circumflexum*
5. *P. elongatum*	4. *P. cathemerium*

W. F.

MANSON-BAHR (P. H.) & WALTERS (A. H.). **Selective Action of Atebrin and Plasmoquine upon the Subtertian Malaria Parasite** (*Plasmodium falciparum*).—*Lancet.* 1934. Jan. 6. pp. 15–16.

The action of atebrin and plasmoquine carefully observed by means of blood culture and the wet coverslip method.

An Indian, aged 24, suffering from malaria, had 1,870 male crescents, 3,190 female crescents, and 1,100 ring forms per cmm. of blood. His blood was examined daily, and cultures were made by Sinton's method. He was given 0·3 grams of atebrin daily for 5 days. On the first day of treatment no changes were seen in the ring-forms and they developed in cultures ; but on and after the second day there was no development in cultures. Within four days all rings had disappeared from the blood, but the crescents were unaffected and, on the moist slide, the females became rounded and the males exflagellated as readily on the fifth day as on the first. For the next five days, 0·04 grams of plasmoquine were given daily. The effect of this on the crescents was very rapid ; on the second day, after 0·08 grams [" 0·8 g." in the paper, an obvious misprint] had been taken, the wet coverslip method showed a complete inhibition of the female gamete, and a curious partial inhibition of the male, which rounded and showed internal activity as usual, but failed to proceed to exflagellation. On the third day of plasmoquine treatment, the crescents appeared quite inert. On the fourth, they were scanty and showed irregularity in outline and staining. On the fifth, none could be found. [The senior author was the first to draw attention to the action of plasmoquine in preventing exflagellation [see this *Bulletin*, Vol. 25, p. 564].]

W. F.

HAYDEN (Reynolds). **The Use of Plasmochin in Malaria to prevent Relapse.**—*U.S. Nav. Med. Bull.* 1934. Jan. Vol. 32. No. 1. pp. 19–20.

Marines who had returned from the tropics with malaria were treated at the Marine Barracks, Quantico, Va. In the presence of a hospital corpsman, 72 were given 10 grains of quinine daily for 8 weeks, except on Sundays, with the result that 17 of them had recurrences towards the end of the course, or soon afterwards. A second batch of 53 men were given 2 centigrams of plasmochin daily for the two first weeks of the quinine course, except on Sundays, with the result that only 3 relapsed. [The simple test for quinine absorption, by adding a few drops of Mayer's solution to the urine, was omitted.] *W. F.*

RUSSELL (Paul F.). **Plasmochin, Plasmochin with Quinine Salts and Atabrine in Malaria Therapy.**—*Arch. Intern. Med.* 1934. Feb. Vol. 53. No. 2. pp. 309–320. [40 refs.]

This is a review of papers which have been published on the subject of plasmoquine and atebrin, with 40 references. Plasmoquine is sold in the following forms :—

Plasmoquine simplex : tablets containing 0·02 gram, or 1/3 grain plasmoquine hydrochloride.

Plasmoquine compound : tablets containing 0·01 gram, or 1/6 grain, of plasmoquine hydrochloride and 0·125 gram, or 2 grains, of quinine sulphate.

Quinoplasmine, Beprochin, or *Plasmoquine with Quinine Salts* : tablets containing 0·01 gram, or 1/6 grain, of plasmoquine hydrochloride and 0·3 gram, or 4½ grains of quinine sulphate. *W. F.*

MASSIAS (Charles). Le 710 et le 574 associés au quiniostovarsol dans le traitement du paludisme. [**Treatment of Malaria by 710 and 574 together with Quiniostovarsol.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1933. June. Vol. 11. No. 4. pp. 377–385. [22 refs.]

It is claimed that both drugs, in combination with quiniostovarsol, act upon all forms of benign and malignant tertian parasites, including crescents [see SICAULT and DECOURT, below].

Ten patients were given 0·08 gram of 710 with 1 gram of quiniostovarsol daily, in two doses. Each course lasted 7 to 10 days, with 7 days interval between them. The action on both *P. vivax* and *P. falciparum* was very rapid. Crescents disappeared in a few days. The drug 710 should be in the form of tablets. The powder changes rapidly and becomes toxic. The tablets should be kept in the ice-chest, away from the light.

The author treated 52 cases with 574 and stovarsol. This drug, 574, is more stable ; the author has kept cachets for 8 months. No toxic symptoms occurred even when the full dose of 0·08 gram of 574 with 1 gram of quiniostovarsol was given daily for 10 days. The drug acted quickly upon the parasites of benign and subtertian malaria. The author states that he has not yet seen a case in which the gametes of *P. falciparum* have resisted 574. [It is difficult to decide how much was due to the quiniostovarsol, and how much to the other drugs.] *W. F.*

SICAULT (G.) & DECOURT (Philippe). Observations sur 17 paludéens traités par le 574 F. [**Seventeen Cases of Malaria treated with 574 F.**]—*Bull. Soc. Path. Exot.* 1934. Feb. 14. Vol. 27. No. 2. pp. 144–146.

The authors treated a series of cases with 574 in 1932, but they found that it did not destroy the crescents. They therefore, in 1933, employed larger doses, varying from 0·7 to 2 milligrams for each kilogram of body weight [0·047 to 0·128 gram for a man weighing 10 stones]. Toxic symptoms were produced by these larger doses, and it became necessary to stop the treatment in 7 out of 17 cases. The drug was active against the different forms of parasites, including crescents, but did not prevent speedy relapse. [See this *Bulletin*, Vol. 30, pp. 200, 479, 850.] *W. F.*

WILLIAMS (C. D.). **Quinine in the Treatment of Malaria in Children.**—*Gold Coast Rep. on Med. Dept. for Year 1932–33.* Appendix 9. pp. 99–104; and *West African Med. Jl.* 1933. Oct. Vol. 7. No. 2. pp. 105–108.

"So much has been written lately about the newer drugs that there is some danger that we may lose sight of the excellence of quinine."

During the years 1931 and 1932, 11,519 cases of malaria were treated at the Princess Marie Louise Hospital for children, Accra, Gold Coast. Accra is comparatively free from mosquitoes, and most of the infections were contracted outside the town. There were 13 deaths among 1,170 children admitted as inpatients. The commonest age for malarial attacks is between 2 months and 3 years. Splenomegaly reacts magically to quinine in young children. Enormous spleens are comparatively rare. Cachexia is uncommon. The most fatal of all types of malaria are those in which the subjects have become profoundly anaemic. A prompt transfusion gives the best chance of success. If the patient does not die from anaemia in the first 24 hours after admission, recovery is almost certain. Anaemic children are treated with iron, arsenic and liver juice in addition to quinine. Severe malaria cases are given 6 grains of intramuscular quinine immediately, almost irrespective of age or size. In the last three months, 300 injections have been given with only two abscesses. *W. F.*

ANALYST. 1934. Mar. Vol. 59. No. 696. pp. 179–180.—**Evaluation of Quinine Excretion by Means of Mayer's Reagent.** [From the Annual Report of the Institute for Medical Research, F.M.S., for 1932.]

"Evaluation of Quinine Excretion by Means of Mayer's Reagent.—Mayer's mercuric chloride reagent is commonly employed in the course of malarial treatment to detect the presence of quinine in urine. In the course of some 1,300 recent examinations of urine Dr. J. W. Field has noted certain anomalies in connection with the test. In alkaline urine containing quinine there appears to be a critical concentration of the alkaloid, the level varying with the degree of alkalinity, below which there is no precipitation with Mayer's reagent. Above that concentration precipitation takes place, although to a less extent than in acid urine. The difficulty may be avoided by using Tanret's acid reagent (3 grms. of potassium iodide and 1 grm. of mercuric chloride in 20 ml. of glacial acetic acid, diluted with water to 60 ml.).

"The statement that Mayer's reagent precipitates albumin is, generally speaking, incorrect. From acid urines it precipitates albumin, but not

from neutral or alkaline urines. When quinine and albumin are both present the quinine alone is usually precipitated by the reagent, the amount of precipitate varying inversely with the concentration of the albumin. This uncertainty may be avoided by using Tanret's reagent, which invariably precipitates the albumin as well as the quinine.

"Preliminary filtration of urine is seldom necessary. Urates dissolve readily on the addition of tap water, and a deposit of phosphates disappears on the addition of acetic acid. Cloudiness due to bacteria may be prevented by the addition of a few drops of formalin, which does not interfere with the reaction.

"Tanret's acid solution is an excellent test reagent for albumin when alkaloids are not present; it is more sensitive than the heat test or the use of Haller's reagent, showing the presence of a trace of albumin in urine within a few seconds."

SERGENT (André) & VOGT (P.). Essais de traitement de la tierce maligne par le "915 Fourneau" ou Rhodoquine. [**The Treatment of Malignant Tertian with Rhodoquine U (Fourneau 915).**]—*Bull. Soc. Path. Exot.* 1933. Dec. 13. Vol. 26. No. 10. pp. 1255–1257. With 1 chart.

The results do not appear to have been very satisfactory. Speedy relapse and toxic symptoms frequently occurred.

Fourneau 915 is a product related to plasmoquine combined with stovarsol. MARCHOUX has found it useful in benign tertian when given in doses of 0·3 grams daily [this *Bulletin*, Vol. 30, p. 850]. The authors treated 11 cases of malignant tertian with 0·4 or 0·45 grams a day for 5 or 6 days, but in these small doses the drug had little or no effect on the fever or the parasites. Twelve patients were given 0·6 grams daily, with the result that the temperature came down in a couple of days and the parasites—crescents as well as rings—disappeared within five days. But relapses soon took place; five relapsed within a week, and two more within a month; three suffered from vomiting. Some patients were able to take larger doses; two were given 1·05 grams a day without ill effects, but the larger doses did not prevent relapses. One patient who was given 0·9 grams daily had severe toxic symptoms which came on four days after the end of the course and continued for fifteen days.

W. F.

SICAULT (G.) & DECOURT (Philippe). Observations sur 25 paludéens traités par la rhodoquine (710 F.). [**Rhodoquine (710 F.) in the Treatment of 25 Cases of Malaria.**]—*Bull. Soc. Path. Exot.* 1934. Feb. 14. Vol. 27. No. 2. pp. 146–149.

Rhodoquine resembles plasmoquine in its action.

The authors employed this drug in Morocco in daily doses of 0·3 to 0·8 milligrams per kilogram of body weight, by the mouth (0·018 to 0·048 grams for an adult), with the result that all parasites, including crescents, disappeared from the blood in a few days except subtertian schizonts. When quinine was given in addition, these schizonts were destroyed. Relapses were not prevented. There were no toxic symptoms; and doses of 1·3 milligrams per kilo (0·08 grams for an adult) are now being given. Larger doses of 3·6 and 10 milligrams per kilo have been given, but they proved toxic [see this *Bulletin*, Vol. 30, pp. 84, 200, 478, 849, 850]. *W. F.*

SERGENT (André) & VOGT (P.). A propos de la rhodoquine (915 Fourneau). [**Rhodoquine Fourneau 915.**]—*C. R. Soc. Biol.* 1934. Vol. 115. No. 14. p. 1571.

The last two summaries concern two substances called Rhodoquine, one numbered Fourneau 915, the other Fourneau 710. Fourneau 915, also called Rhodoquine U, was used by Sergent and Vogt, and must be distinguished from the ordinary Rhodoquine used by SICAULT and DECOURT, which is 710. The tolerated dose of the latter is 4–5 cgm., and the dose employed is about 3 cgm. which is 20 times less than that of 915. [M. FOURNEAU has kindly informed us that the makers used the name Rhodoquine for all the derivatives of quinolein having the same nucleus as plasmoquine, attaching a letter of the alphabet to the common name to indicate the different derivatives, but that to avoid confusion Rhodoquine U will henceforward be known only as 915 F., and the name Rhodoquine will be kept for 710 F.] *A. G. B.*

TARA (Stéphan). Sur l'emploi de la dihydroquinamine. [**The Use of Dihydroquinamine in St. Barthélemy.**]—*Rev. Méd. et Hyg. Trop.* 1933. Sept.–Oct. Vol. 25. No. 5. pp. 246–255. With 1 chart.

Interesting sidelights on the island and the cashew nut by an enthusiastic medical officer.

The little French island of St. Barthélemy lies near the Leeward Islands; although it is within the tropics its population of 3,000 is almost entirely white; they and their forbears have lived there since the island was occupied 300 years ago. In 1932, there were 62 births and 27 deaths among 2,200 white inhabitants. The only water is rain water which is collected in cisterns. There is one swamp, which dries up in the dry season. The only anopheline is "*Maculipennis albimanus*" (? *A. albimanus*). It bites only in the dusk of morning and evening, but never in the night; in the dark corners of a house, it will bite in the daytime. During the dry season it is unnecessary to use a mosquito net. There is very little malaria on the island, and it is nearly always imported, generally from Guadaloupe; consequently it is known as the "Guadaloupe disease." Occasionally one of these imported cases infects other members of his family and a small outbreak occurs which is limited to one household; other families living 200 to 500 metres away are not affected. The author gives an account of six cases. Two of these were small children who had never left the island, but there is no record of their blood examination or of the finding of malaria parasites. The other four patients were adults who had become infected outside the island. Crescents were found in two, and rings in one. The author found dihydroquinamine very efficacious; he adminstered it, diluted with water, by rectal injection. He does not say that this is the best method, but it was the one best suited to his practice, in the pursuit of which he had to climb mountainous paths under a tropical sun to reach his scattered patients. [The use of additional remedies and the paucity of blood examinations make his claim for dihydroquinamine unconvincing.]

There is an interesting note on the cashew nut tree. If the edge of a glass of spirits, wine, or beer is rubbed with a young leaf, the contents become highly intoxicating. Drinks doctored in this way are often

given to European visitors "*à faire une plaisanterie.*" The cashew fruit macerated in rum, forms a pleasant but highly intoxicating drink. The shell of the nut contains a vesicant fluid with remarkable aphrodisiac properties. *W. F.*

KROUCH (M.). La chimiothérapie antipaludéenne. Essais d'un complexe gaméticide (CG) en milieu rural tunisien. [**Trial of Complexe Gaméticide (CG) or Gamétoxyl for Malaria in Tunis.**]—*Bull. Soc. Path. Exot.* 1934. Feb. 14. Vol. 27. No. 2. pp. 141–144.

A drug containing quinine, arsenic and dihydroquinamine.

This drug is made in two forms, ampoules for injection, and dragees for oral administration :—

A.—Formula of CG. for injection.

Chlorhydrate de diéthanol dihydroquinamine uranyle	·01 gm.
Benzylène éthyl arsianilate de diéthanol dihydroquinamine	·01 ,,
Chlorhydrate neutre de quinine	·35 ,,
Uréthane	·175 ,,
Solution glucosée à 25 o/o et phénolée à 10 o/oo q.s. ...	5 cc.

B.—Formula of CG. for dragees.

Chlorhydrate de diéthanol dihydroquinamine uranyle	·025 gm.
Benzylène éthyl arsianilate de diéthanol dihydroquinamine	·050 ,,
Ethylcarbonate de quinine	·225 ,,

In a first test, 25 cases of benign tertian and 32 of subtertian were treated. The doses varied from 1 to 2 ampoules a day for 2 days or more, followed by 2 to 4 dragees a day for 4 days or more. The parasites disappeared in all the benign tertian cases ; there were 26 successes and 6 failures among the 32 subtertian cases. Crescents disappeared in 2 to 20 days. In 13 cases of benign tertian and 20 of subtertian, under observation for 20 days to 4 months, there was only one relapse. Other trials were made with much the same results ; in one, a group of 42 persons was given gamétoxyl as a prophylactic, and a second group of 41 was given 6 grains of quinine daily ; the results were similar. [An ampoule of gamétoxyl contains about 5 grains of quinine, and a dragee contains 3½ grains. It is difficult to decide whether the other constituents played any part in its specific action.] *W. F.*

TATE (P.) & VINCENT (M.). **The Action of Synthetic Quinoline Compounds on Avian Malaria.**—*Parasitology.* 1933. Dec. Vol. 25. No. 4. pp. 411–427. [27 refs.]

Plasmoquine proved superior to quinine in sterilizing canaries, and, given after inoculation of malaria, it greatly prolonged the incubation. R.25 and R.36 resemble plasmoquine. Plasmoquine mixed with blood in vitro produces methaemoglobin.

The drugs were tested on female German roller canaries infected with *P. relictum* by direct blood inoculation. Forty-eight per cent. of the untreated birds showed parasites by the fifth day, or sooner, and 99 per cent. before the tenth day. The parasites increased until about the tenth day and then decreased until the birds went into the chronic state with less than one parasite per field, on about the seventeenth day. The mortality was only about 2 per cent. Only 2 untreated birds relapsed out of 21 observed for long periods. Birds with chronic

infections were not susceptible to re-inoculation with the same strain, but, if the blood had been sterilized by treatment, re-inoculation was followed by an acute attack. The drugs to be tested were passed into the stomach by a catheter. Six daily doses were given on consecutive days, the first 4 hours after the bird was inoculated with malaria. With quinine hydrochloride, the maximum tolerated dose was 10 mgm. and the minimum effective dose 2·5 mgm., so that the therapeutic index was 1 : 4. Two out of 10 birds were sterilized. With plasmoquine, the therapeutic index was 1 : 30. Sixteen out of 33 birds were sterilized, and in the other 17 the incubation period was greatly lengthened. To test the prophylactic action, 3 birds were given plasmoquine daily for 4 days and were then inoculated with malaria : the drug had no prophylactic action. Three more birds were inoculated and subsequently given plasmoquine for 4 days. Given in this way it acted prophylactically ; infection was not prevented, but the incubation period was lengthened to 70 days.

Thirteen new quinoline compounds prepared by Professor ROBINSON and his colleagues were tested in the same way. Two of these compounds, R 25=8-γ-aminopropylamino-6-ethoxyquinoline and R 36, the similar methoxyquinoline, were found to resemble plasmoquine in their action, to be nearly equal to it in potency, and to have therapeutic indices of 1 : 16. The compound R 36 has been tested by JAMES, NICOL and SHUTE in malignant tertian malaria, but it proved inactive.

The action of plasmoquine, R 25 and R 36 upon normal blood was studied in vitro. Plasmoquine in a dilution of 1 in 50,000 produced methaemoglobin ; R 25 and R 36 were even more active in this respect.

W. F.

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